Chapter 4 — Environmental Consequences

In this Chapter:

- **Specific impacts from alternatives**
- **Recommended mitigation**
- **Cumulative impacts**

This chapter discusses the potential environmental impacts of the Agency Preferred Alternative (Alternative 2), other construction alternatives (Alternatives 1, 3, and 1A) and the No Action Alternative. Each alternative is composed of line segments discussed in Chapter 2, *Alternatives*, Section 2.1, *Segments*. Existing resources along each line segment are discussed in Chapter 3, *Affected Environment*. Like Chapter 3, this chapter discusses resources associated with the natural environment first and then the human environment. Impacts are discussed by alternative with reference to segments. A few resources (e.g., Air Quality) discuss the project as a whole because, for that resource, the impacts are the same for each alternative.

To analyze potential impacts for construction, operation, and maintenance activities, resource specialists have analyzed actions using a scale with four impact levels: high, moderate, low, and no impact. Because definitions of these impact levels vary with each resource, explanations are provided with each of the resource discussions.

Specialists have considered the direct and indirect impacts of the alternatives, over the short and long term. Direct impacts are caused by and occur at the same time and place as construction, operation, and maintenance activities. Indirect impacts are caused by the same activities but occur later in time or are farther removed in distance. However, these impacts are still reasonably foreseeable.

Impact discussions include recommended ***mitigation*** that could reduce both the direct, indirect, and ***cumulative impacts*** of the proposed alternatives. The level of detail for the impact discussions of each resource depends on that resource's character, and the significance of the issue. Additional detail for some resources is included in appendices.

Construction of the alternatives would be typical of other BPA transmission line projects (for details, see Appendix B, *Construction and Maintenance Activities*). General construction steps are summarized and information on structure site activities are given in the boxes below.

➡ For Your Information

Please review Chapter 2, Alternatives, for a full description of the alternatives.

Refer to Map 2, Alternatives, to review locations of the line segments and alternatives.

***Mitigation** describes measures that could be taken to lessen the impacts predicted for each resource. These measures may include reducing or minimizing a specific impact, avoiding it completely, or rectifying or compensating for the impact.*

***Cumulative impacts** are created by the incremental effect of a specific action when added to other past, present, or reasonably foreseeable future actions.*

Construction Steps

Typical transmission line construction steps include:

- improving or constructing access roads
- clearing ROW
- preparing structure sites
- excavating and installing structure footings
- delivering structures to the sites (steel, insulators, conductors, and other miscellaneous equipment)
- assembling and erecting structures
- stringing and tension conductor, ground wire, and fiber optic cable
- installing counterpoise

Structure Site Activities

All vegetation would be removed from structure sites. Sites would be graded, if needed, to provide a level work area. An average area of about 100 ft by 100 ft would be disturbed at each structure site.

Each leg of a tower has a footing. Footings for suspension towers generally occupy an area of about 6 ft by 6 ft, to a depth of 12 ft. Footings at angle points would be larger and deeper, about 15 ft by 15 ft and 16 ft deep.

For Your Information

For related water quality effects, see separate discussions under Sections 4.2, Floodplains and Wetlands; 4.4, Wildlife; and 4.5, Fish Resources.

4.1 Water Resources, Soils, and Geology

Impacts to water, soils, and geology are interrelated and discussed as a group in this section.

4.1.1 Impact Levels

A **high** impact would occur where:

- a water body that supports sensitive fish, waterfowl, and animal habitat, or human uses such as drinking water would be extensively altered so as to affect its uses or integrity.
- the possibility of oil spills from substation equipment reaching groundwater would be high, such as in shallow groundwater areas, highly permeable soils, and where no secondary spill containment or protective measures are used.
- water quality would be degraded below state or federal agency standards and site conditions would be so unfavorable that major reclamation, special designs, or special maintenance practices would be required.
- road or facility construction or clearing would be required on sites that are prone to mass movement or have very high susceptibility to erosion.
- soil properties would be so unfavorable or difficult that standard mitigation measures, including revegetation, would be ineffective.
- long-term impacts associated with accelerated erosion, sedimentation, or disruption of unstable slopes would occur.

A **moderate** impact would occur where:

- water quality degrades below state or federal standards, but can be partially mitigated to lessen impacts. Site conditions require special planning and design.
- construction and clearing takes place near a water body on erodible soils that have moderate revegetation potential.
- new roads would be constructed across a stream or where existing stream crossings are inadequate and would require rebuilding.
- impacts would continue to occur until disturbed areas are reclaimed and sediment is no longer transported to surface waters.
- soil properties and site features are such that mitigation measures would be effective in controlling erosion and sedimentation within acceptable levels.
- impacts would be primarily short-term, with an increase in normal erosion rates for a few years following soil disturbance until erosion and drainage controls become effective.
- there would be little possibility of oils or other pollutants affecting groundwater because their level is deep, soils are relatively non-porous, and facilities have some minor spill protective measures.

A **low** impact would occur where:

- impacts to water quality could be easily mitigated to state or federal standards with common mitigation measures.
- there would be little or no possibility of oil or other pollutants affecting groundwater because their level is deep, soils are relatively non-porous, and facilities have good oil spill containment protective measures.
- structures or access roads near water bodies would be in stable soils on gentle terrain, with little or no clearing.
- structures would be away from water banks and little or no sediments would reach the water.
- there would be no construction or major reconstruction of roads.
- road and facility construction and clearing would be required on soils with low to moderate erosion hazard, and the potential for successful mitigation would be good using standard erosion and runoff control practices.

- erosion levels would be held near normal during and following construction.

No impact would occur where water quality and soils would remain unchanged.

4.1.2 Impacts Common to Construction Alternatives

Impacts to soils and geology are generally based on a site's susceptibility to long-term degradation. The following factors can increase a site's susceptibility:

- being prone to erosion and mass movement.
- having soils that are susceptible to compaction.
- having steep slopes.
- undergoing extensive clearing and access road construction.
- disturbing the soil surface and subsurface and removing vegetation increases the risk of soil erosion and mass movement, and may change soil productivity.

For Your Information

***Turbidity** is a reduction in the clarity of water from suspended materials such as clay, mud, organic material, or other materials.*

There are several general impacts of concern relating to hydrology and water quality:

- Runoff can increase sedimentation and water ***turbidity***.
- Road improvements and vehicular traffic at stream crossings can increase turbidity and alter stream channels.
- When agriculture soils are disturbed, nutrients leached from the soil or transported on soil particles can stimulate the growth of undesirable aquatic vegetation.
- Clearing streamside vegetation can increase a stream's exposure to sunlight, possibly raising water temperature.

Direct impacts would be caused by access road construction and improvements, maintenance activities, ROW clearing, and site preparation for structures and other facilities. Canals and creek crossings, including one shoreline of the State (Naneum Creek) crossing, would use existing bridges fords and culverts, or would have new fords or culverts installed in coordination with U.S. Fish and Wildlife Service (USFWS), Corps of Engineers (COE), and appropriate state agencies. New crossings would disturb the soil surface; increase erosion, runoff, and sedimentation in nearby watercourses; impair soil productivity; and remove land from production. At this time, exact crossing locations are not known. Until final designs are completed, the amount of soil exposed by project construction can only be estimated. Table 4.1-1, *Area of Ground Disturbance*,

summarizes the area of ground disturbance, and Table 4.1-2, *Access Road Distances*, summarizes the length of new access roads and improvements to existing access roads.

It is not anticipated that impacts to ***303(d) streams*** would alter those parameters for which they are listed, as described in Section 3.1.2.1, *Water Quality*. In addition, impacts to aquifers are not anticipated, provided that the proposed project would comply with local ordinances and laws and state and federal water quality programs that prevent degradation of the quality of aquifers and do not jeopardize their usability as a drinking water source.

Table 4.1-1
Area of Ground Disturbance

B_{NORTH} / B_{SOUTH}	Preferred (2) (acres)	Alternative 1 (acres)	Alternative 3 (acres)	Alternative 1A (acres
Access Road	–	446.3	585.2	473.2
	340.7	453.4		480.3
Towers	–	62.2	61.5	73.9
	71.1	63.1		74.8
Total	–	508.5	646.7	547.1
	411.8	516.5		555.1

Table 4.1-2
Access Road Distances

B_{NORTH} / B_{SOUTH}	Preferred (2) (miles)	Alternative 1 (miles)	Alternative 3 (miles)	Alternative 1A (miles)
New Construction	–	93.4	130.4	111.4
	64.7	94.9		112.9
Improvements to Existing	–	84.2	98.0	69.9
	74.6	85.5		71.2
Total Length	–	177.6	228.4	181.3
	139.3	180.4		184.1

Some of the new access for the proposed project would be in steeply sloped terrain, which would increase soil exposure. Following construction, implementation of optimum erosion controls and revegetation of disturbed sites (cut and fill slopes and structure sites) would reduce the amount of soil exposure by about 60-70 percent. Impacts would be greatest in local sensitive areas susceptible to ***rill*** and ***gully*** erosion, and areas of unstable soil and rock. Short-term impacts during and following construction would be most intense. The intensity of long-term impacts would be directly proportional to the success of revegetation, and erosion and runoff control efforts. With implementation of ***Best Management Practices*** (BMPs),

For Your Information

Section 303(d) streams, *as defined by the Federal Clean Water Act, are water quality limited streams that fall short of state surface water quality standards and are not expected to improve within the next four years.*

Reminder

Rill erosion *is mild water erosion caused by overland flow producing very small and numerous channels.*

Gully erosion *is rapid erosion, usually in brief time periods, that creates a narrow channel that may exceed 100 ft. in depth.*

Best Management Practices *are a practice or combination of practices that are the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.*

sedimentation could be reduced to acceptable levels and would not cause degradation of water quality below the Washington Department of Ecology (WDOE) standards. Impacts to water and soils are summarized in Table 4.1-3, *Impacts to Water and Soil Resources.*

Table 4.1-3
Impacts to Water and Soil Resources

Alternative	Actions	Impacts to Soil	Impacts to Water Resources
Preferred (2)	Construction of structures and access roads, use of fords or culverts at stream crossings, removal of structures, crossing of areas with 25-50% slopes	Low to moderate erosion and loss of productive soils. Some increased runoff and sedimentation.	Short-term moderate sedimentation and increased runoff, short-term turbidity. Water bodies: Caribou, Coleman, Cooke Canyon, Naneum, Cave, Parke, Schnebly, Wilson, Columbia River[1,2,5], Johnson, Middle Canyon
1	Construction of structures and access roads, use of fords or culverts at stream crossings, removal of structures, crossing of areas with 25-50% slopes, crossing adjacent to Saddle Mountain Lake	Low to moderate erosion and loss of productive soils. Some increased runoff and sedimentation.	Short-term moderate sedimentation and increased runoff, short-term turbidity. Water bodies: Caribou, Coleman, Cooke Canyon, Naneum, Cave, Parke, Schnebly, Wilson, Columbia River[1,2,5], Johnson, Middle Canyon, Lower Crab [1,2,3,4], Nannully Lake, Saddle Mountain Wasteway, various canals
3	Construction of structures and access roads, use of fords or culverts at stream crossings, removal of structures, crossing of areas with 25-50% slopes or greater.	Moderate erosion, increased runoff. Loss of productive soils.	Moderate sedimentation, short-term turbidity, increased runoff. Water bodies: Caribou, Coleman, Cooke Canyon, Naneum, Cave, Parke, Schnebly, Wilson, Alkali, Cold, Hanson, Johnson, Middle Canyon, Corral, various canals
1A	Improvements to existing access roads only, use of ford or culvert at Cold Creek crossing, crossing areas with 25 to 45% slopes, double-circuit in agricultural lands	Low erosion, loss of productive soils	Short-term low sedimentation Water bodies: Cold (intermittent at crossing during summer months), Lower Crab Ck[1,2,3,4], Columbia River[1,2,5], various canals, Mattawa Drain[2]: Nannully Lake, Saddle Mountain Wasteway, various canals
No Action	Ongoing maintenance	None to low, localized soil disruption	Continued vehicle and machinery use and vegetation management practices.

303(d) listings for: 1-pH, 2-Temperature, 3-PCB, 4-DDE, 5-Dissolved gas, 6-DO, 7-Fecal Coliform

Increased sediment in streams is expected from the construction of an alternative. The volume of peak flow and the amount of sediment entering streams would depend on site-specific conditions. Mitigation measures proposed for construction of the line would help reduce the chance of large amounts of sediment entering streams.

The new line would be constructed to prevent interference with ongoing farm conservation efforts to control erosion and maintain water quality. Although minor, localized increases in erosion, runoff, and sedimentation are expected from construction and maintenance. These increases would have a low impact on the area's soil resources and water quality, and would not impair the current beneficial use of any water body.

4.1.3 No Action Alternative

The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance and potential sedimentation due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. In addition, vehicle and machinery use, and vegetation management practices could contribute minor amounts of pollutants (e.g., fuel, oil, grease, rubber particulate, woody debris) that could be transported to streams.

4.1.4 Recommended Mitigation

Standard mitigation would use measures best suited to each individual location, in order to reduce erosion and runoff and stabilize disturbed areas during and after construction. The following measures, used alone or in combination, would minimize soil disturbance and the effects of increased erosion and surface runoff created by access road improvements and transmission line construction:

- Properly space and size culverts; use crossdrains, water bars, rolling the grade, and armoring of ditches; drain inlets and outlets.
- Coordinate all culvert and ford installations with the COE and other appropriate state agencies.
- Preserve existing vegetation where possible, and stabilize disturbed portions of the site. As soon as practicable, stabilization measures would be started where construction activities have temporarily or permanently ceased.
- Seed disturbed sites at the appropriate times to minimize the invasion of non-native species using a native herbaceous seed mixture suited to the site. Work with WDFW and USFWS to determine appropriate planting times and methods.
- Use vegetative buffers and sediment barriers to prevent sediment from moving off site and into water bodies.

➡ For Your Information

Compaction affects soil productivity, reduces infiltration capacity, and increases runoff and erosion. Sub soiling, normal farming, cultivation and cropping, and freeze-thaw cycles restore soils to their pre-construction condition.

***Sub soiling** is plowing or turning up the layer of soil beneath the topsoil.*

- Discuss with farm operators ***sub soiling*** to restore soil productivity and monetary compensation.
- Design and construct all fords and bridges to minimize bank erosion. Specific locations and measures would be determined when road and line design are finalized.
- Schedule maintenance operations during periods when precipitation and runoff possibilities are at a minimum, in order to reduce the risk of erosion, sedimentation, and soil compaction.

For Your Information

Full-bench road construction *is cutting into the hillside to accommodate the whole road prism.*

- Design substation facilities to meet regional seismic criteria.
- If needed to stabilize the roadbed, consider ***full-bench road construction*** and hauling excess sidecast material on slopes exceeding 55 percent. Prior to construction, suitable waste areas should be located where excess materials can be deposited and stabilized.
- Use the BMPs that would prevent further impairment of water quality limited (WQL) drainages.
- Avoid riparian areas, drainage ways, canals, and other water bodies. When these areas cannot be avoided, apply sediment reduction practices in order to prevent degradation of riparian or stream quality. Riparian plantings may be used where needed, to restore streamside vegetation and ensure stream bank stability.
- Restrict road construction to the minimum needed and obliterate roads in agricultural land.
- Avoid or mitigate water quality and fish habitat degradation. Design and maintain roads so that drainage from the road surface does not directly enter live streams, ponds, lakes, or impoundments. Direct water off of roads into vegetated areas, or control it through other sediment-reduction practices. Restrict road construction to areas that are physically suitable, based on watershed resource characteristics. Design stream crossings to avoid adverse impacts to stream hydraulics and deterioration of stream bank and bed characteristics.
- Avoid the discharge of solid materials, including building materials, into US waters. Off-site tracking of sediment and the generation of dust shall be minimized. Vegetative buffers would be left along stream courses to minimize erosion and bank instability.

- Prepare a stormwater pollution prevention plan (as required under the National Pollution Discharge Elimination System General Permit).
- Near all water bodies, set crossing structures as far back from stream banks as possible. Avoid refueling and/or mixing hazardous materials where accidental spills could enter surface or groundwater. This information will also be included in the Project Plan.
- Design the project to comply with state and federal water quality programs, in order to prevent degradation of the quality of aquifers and not jeopardize their usability as a drinking water source.

For measures required for stormwater regulations, see Section 5.14, *Discharge Permits under the Clean Water Act*.

4.1.5 Cumulative Impacts

Current and future agriculture, YTC activities, and other land development activities in the watersheds crossed might increase peak flows and introduce sediment into streams. Increased sediment in streams is expected from construction of the project in addition to agricultural and other land disturbing activities. The volume of peak flow and the amount of sediment entering streams would depend on site-specific conditions. Mitigation measures proposed for construction of the line would help reduce the chance of large amounts of sediment entering streams. This project would be constructed to prevent interfering with ongoing farm conservation efforts to control erosion and maintain water quality. Although minor, localized increases in erosion, runoff, and sedimentation are expected from construction and maintenance, these increases would have a low impact on the area's soil resources and water quality and would not impair the current beneficial use of any water body.

4.2 Floodplains and Wetlands

4.2.1 Impact Levels

Impacts would be considered **high** where:

- a wetland area would be destroyed by permanently filling all or most of it, or by altering wetland hydrology.
- a wetland area would be destroyed that serves as habitat for a rare plant or animal species, or that is considered a rare wetland type.
- one or more significant wetland functions would be destroyed, such as the ability to provide wildlife habitat, improve water quality, detain water during peak flows, recharge groundwater, trap sediment, serve as a recreational use, or provide an aesthetically pleasing landscape.

For Your Information

Scrub-shrub wetlands *are wetlands dominated by shrubby plants.*

- wetland vegetation cover type(s) would be permanently affected through altering soils or hydrology, such as converting a **scrub-shrub wetland** to an open-water area.
- all or most of the native wetland vegetation would be replaced with weedy, non-native species.
- the connectivity of a wetland to other wetlands, surface waterways, or sub-surface water features would be destroyed.

*A **Buffer Area** is a strip of vegetation surrounding a stream or wetland that provides habitat for wildlife, reduces or traps sediments, and slows runoff velocity.*

- a wetland ***buffer area*** would be destroyed, resulting in impaired wetland functions, such as the ability to provide wildlife habitat.
- The amount of flood storage in a floodplain would be significantly decreased, or the course of flood waters would be altered.

Impacts would be considered **moderate** where:

- a portion of a wetland area would be filled such that the majority of the wetland would still able to function as a wetland (e.g., for a road crossing through an adjacent wetland along a creek).
- a rare or unique wetland type would be degraded.
- one or more significant wetland functions would be degraded or impaired.
- the diversity of native plant species within a wetland would be significantly decreased.

- native trees in ***riparian*** areas that pose a safety hazard to transmission lines would be removed.
- a native wetland plant community would be degraded through the introduction of weedy, non-native species.
- hydrology would be decreased such that a wetland would decrease in size, or the vegetation cover type would be partially altered.
- the connectivity of a wetland to other waters would be diminished.
- a wetland buffer area would be partially destroyed or degraded, resulting in impaired wetland functions.
- the amount of flood storage in a floodplain would be moderate decreased.

Reminder

Riparian *refers to vegetated areas surrounding streams, rivers, lakes, or wetlands.*

Impacts would be considered **low** where:

- a wetland would be temporarily filled or wetland hydrology, soils, or vegetation would be altered. This would be followed by restoring the area to its former condition or enhancing the area (as demonstrated through subsequent monitoring activities).
- a wetland function or value would be temporarily disrupted or partially diminished.
- the amount of flood storage in a floodplain would slightly decrease (e.g., due to erecting a structure in a floodplain).

No impact would occur where:

- direct impacts to wetlands would be avoided.
- wetland hydrology, vegetation, or soils would not be affected by nearby activities.
- the functions of a wetland area would not be affected by nearby activities.
- direct impacts to floodplains would be avoided.

4.2.2 Impacts Common to Construction Alternatives

Floodplains within the study area may be directly impacted by the placement of structures in several locations. However, impacts would be avoided by placing structures in areas adjacent to floodplains. It is not expected that constructing access roads to these structures would impact floodplains, because this would not alter the amount of flood storage or the course that flood waters would take.

Impacts to wetland areas generally impair or remove wetland functions, either temporarily or permanently. These impacts generally decrease a wetland's ability to provide food, water, or cover for wildlife. Building structures or roads near wetland areas could destabilize soils and slopes, and increase sedimentation in wetlands. Wetland areas overloaded with sediments may lose their ability to filter nutrients and pollutants, which affects water quality. Filling wetlands, even partially, may decrease the area that can be used for stormwater storage and wildlife habitat. When wetlands adjacent to creeks are impacted, their ability to slow in-stream flow and decrease streambank erosion can be impaired.

It is unlikely that any wetlands within the study area would be directly impacted by the placement of structures. Most of the wetlands within the study area are not extensive, and can be spanned by structures placed in upland areas adjacent to wetlands.

An unavoidable direct impact to wetlands would result from building access roads. Some portions of wetland areas along creeks would need to be filled for road crossings. Roads and culvert crossings would be designed to minimize impacts to wetland areas. The placement of culverts and roads in riparian areas constitutes a moderate level of impact.

It is likely that some of the stream crossings do not have adjacent wetlands. In areas where creek channels are dry for most of the year, it may be possible for access roads to ford these streams without impacting wetlands.

The ongoing maintenance of transmission lines and access roads would impact wetlands in several ways. Some trees may need to be removed for safety reasons. Because trees are uncommon along riparian areas in shrub-steppe communities, they serve an important function as nesting and perching habitat for birds. For this reason, removing or topping trees is considered a moderate level of impact. Roads serve as a corridor for invasion by some weed species that tend to grow in wet areas. If ***noxious weeds*** were introduced into riparian or wetland areas as a result of project activities, this would be a moderate level of impact. Spraying of weeds along roads would affect water quality, a low level of impact. Road maintenance and grading may increase sedimentation into waterways, a low level of impact.

If any impacts to wetlands cannot be avoided through careful design, BPA would engage in the permitting process with the COE and the WDOE. Appropriate mitigation would be proposed and coordinated with these agencies.

Reminder

Noxious weeds *are particularly troublesome weeds designated by Washington State law. The list of noxious weed species is divided into three classes (A, B, and C) within each county, based on the state of invasion.*

4.2.3 Preferred Alternative (Alternative 2)

4.2.3.1 Segment A

Structures along Segment A would not be placed in any wetlands or riparian areas. Some trees may need to be cut along Wilson, Naneum, and Cooke Canyon Creeks if they pose a safety hazard. This would be a moderate level of impact.

➡ For Your Information

***NWI**: National Wetland Inventory*

The ***NWI*** depicts 16 narrow wetlands associated with intermittent and perennial creeks in Segment A. Seven of these may need to be crossed by an access road, which would be a moderate level of impact. Eight others have existing crossings which may need to be improved. One wetland would not be crossed by an access road (See Table 4.2-1, *Segment A Impacts to NWI Mapped Wetlands*.) Floodplain impacts will be minimized by designing and placing road crossing structures to maintain existing channel properties and floodplain function. Nonetheless, placing structures such as culverts or bridges may alter flood flows, a high impact.

The reroute in Segment A would result in the same impacts as shown in Table 4.2-1, *Segment A Impacts to NWI Mapped Wetlands*. Cooke Canyon Creek would be crossed further to the south, resulting in a moderate impact.

Table 4.2-1
Segment A Impacts to NWI Mapped Wetlands

Name (if known)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Naneum Creek (north crossing)	Naneum Canyon T19N, R19E, Sec 20	Existing Access Road Crossing, May Need Improvement (Moderate)
Wilson Creek (north crossing)	Naneum Canyon T19N, R19E, Sec 20	Existing Access Road Crossing, May Need Improvement (Moderate) Possible Tree Removal (Moderate)
Naneum/Wilson Creek crossing	Colockum Pass SW T19N, R19E, Sec 20	No Road Crossing (No Impact) Possible Tree Removal (Moderate)
Unnamed creek	Colockum Pass SW T19N, R19E, Sec 21	Possible Access Road Crossing (Moderate)
Cave Canyon	Colockum Pass SW T19N, R19E, Sec 28	Existing Access Road Crossing, May Need Improvement (Moderate)
Unnamed creek	Colockum Pass SW T19N, R19E, Sec 27	Possible Access Road Crossing (Moderate)
Charlton Canyon	Colockum Pass SW T19N, R19E, Sec 27	Possible Access Road Crossing (Moderate)
Tributary of creek in Charlton Canyon	Colockum Pass SW T19N, R19E, Sec 27	Possible Access Road Crossing (Moderate)

➡ Reminder

Mapped wetlands are shown on Map 5, Wetlands/Plant Associations.

Name (if known)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Creek in Schnebly Canyon	Colockum Pass SW T19N, R19E, Sec 26	Existing Access Road Crossing, May Need Improvement (Moderate)
Coleman Creek	Colockum Pass SW T19N, R19E, Sec 36	No Road Crossing (No Impact)
Cooke Canyon Creek	Colockum Pass SW T18N, R20E, Sec 6	Existing Access Road Crossing, May Need Improvement (Moderate) Possible Tree Removal (Moderate)
Trail Creek	Colockum Pass SE T18N, R20E, Sec 5	Possible Access Road Crossing (Moderate)
Caribou Creek	Colockum Pass SE T18N, R20E, Sec 8	Existing Access Road Crossing, May Need Improvement (Moderate)
Tributary of Caribou Creek	Colockum Pass SE T18N, R20E, Sec 16	Possible Access Road Crossing (Moderate)
Parke Creek	Colockum Pass SE T18N, R20 E, Sec 27	Existing Access Road Crossing, May Need Improvement (Moderate)
Unnamed creek	Boylston T17N, R21E, Sec 20	Possible Access Road Crossing (Moderate)

4.2.3.2 Segment B

The Preferred Alternative would follow Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used for this alternative.

Option B_{SOUTH} – Option B_{SOUTH} would span all wetlands and riparian areas. Three narrow wetlands associated with creeks, are mapped along Option B_{SOUTH}. Structures would be placed outside riparian areas, but these creeks may be traversed by an access road, a moderate level of impact. Structures would not be placed within the Columbia River floodplain, resulting in No Impact. (See Table 4.2-2, *Option B_{SOUTH} Impacts to NWI Mapped Wetlands*.)

Table 4.2-2
Option B_{SOUTH} Impacts to NWI Mapped Wetlands

Name (if known) (P=Perennial I=Intermittent)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Tributary of Johnson Creek	Doris T16N, R22 E, Sec 21	Possible Access Road Crossing (Moderate)
Tributary of Johnson Creek	Doris T16N, R22 E, Sec 22	Possible Access Road Crossing (Moderate)
Tributary of Johnson Creek	Doris T16N, R22 E, Sec 23	Possible Access Road Crossing (Moderate)
Columbia River	Beverly T16N, R23E	No Impact

4.2.3.3 Segment D

Structures along Segment D would avoid all wetlands and riparian areas, however, access roads may be required across two of the six wetland areas, a moderate level of impact (See Table 4.2-3, *Segment D Impacts to NWI Mapped Wetlands*.). Depending on the location and the species, there may be some trees in the riparian areas that would need to be removed or topped to ensure transmission line safety, a moderate level of impact. Floodplain impacts will be minimized by designing and placing road crossing structures to maintain existing channel properties and floodplain function. Nonetheless, placing structures such as culverts or bridges may alter flood flows, a high impact.

Dry Creek, immediately to the south of the proposed new Wautoma Substation, would be avoided, resulting in no wetland impacts. The proposed Wautoma Substation will be built above the floodplain, therefore no impacts to the floodplain will occur.

Table 4.2-3
Segment D Impacts to NWI Mapped Wetlands

Name (if known)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Lower Crab Creek	Beverly T15N, R23E, Sec 2	No Road Crossing (No Impact) Possible Tree Removal (Moderate)
Wetland	Priest Rapids NE T14N, R24E, Sec 5	No Impact
Columbia River	Priest Rapids NE T13N, R24E, Sec 11	No Impact
Cold Creek	Emerson Nipple 99/3-99/4 T13N, R24E, Sec 34	Possible Access Road Crossing (Moderate)
Unnamed creek	Emerson Nipple T13N, R24E, Sec 34	Possible Access Road Crossing (Moderate)
Dry Creek	Emerson Nipple T12N, R24E, Sec 20	No Impact

4.2.4 Alternative 1

Impacts to wetlands along Segment A would be the same as described under the Preferred Alternative (see Section 4.2.3.1, *Segment A*).

Reminder

Segments A and B would have a moderate impact to wetlands.

4.2.4.1 Segment B

The Preferred Alternative would follow Option B_{NORTH} of Segment B. Option B_{SOUTH} would not be used for this alternative.

Option B_{NORTH} – Option B_{NORTH} would span all wetlands and riparian areas. Two narrow wetlands associated with creeks are located along Segment B. Although structures would be placed outside riparian areas, these creeks may be traversed by an access road, which would be a moderate level of impact. Structures would not be placed within the Columbia River floodplain, resulting in No Impact. (See Table 4.2-4, *Option B_{NORTH} Impacts to NWI Mapped Wetlands*.) Floodplain impacts will be minimized by designing and placing road crossing structures to maintain existing channel properties and floodplain function. Nonetheless, placing structures such as culverts or bridges may alter flood flows, a high impact.

Table 4.2-4
Option B_{NORTH} Impacts to NWI Mapped Wetlands

Name (if known)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Unnamed creek	Doris T16N, R22E, Sec 15	Possible Access Road Crossing (Moderate)
Unnamed creek	Doris T16N, R22E, Sec 23	Possible Access Road Crossing (Moderate)
Columbia River	Beverly T16N, R23E	No Impact

4.2.4.2 Segment E

No structures along Segment E would be constructed within a wetland or riparian area. There may be trees in riparian areas that would need to be removed or topped for safety, a moderate level of impact. Floodplain impacts will be minimized by designing and placing road crossing structures to maintain existing channel properties and floodplain function. Nonetheless, placing structures such as culverts or bridges may alter flood flows, a high impact.

In the valley agricultural areas, the proposed line would cross four irrigation ditches that have National Wetland Inventory (NWI) designations. Structures would be situated to avoid these ditches, although they may be crossed by access roads, a moderate level of impact. (See Table 4.2-5, *Segment E Impacts to NWI Mapped Wetlands*.)

Table 4.2-5
Segment E Impacts to NWI Mapped Wetlands

Name (if known)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Wetland	Beverly T16N, R23E, Sec 35	No Impact
Wetland	Beverly	No Impact

Name (if known)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
	T16N, R23E, Sec 35	
Wetland fed by outflow channel from Nunnally Lake	Beverly T16N, R23E, Sec 35	No Impact
Lower Crab Creek	Beverly T15N, R23E, Sec 2	No Road Crossing (No Impact) Possible Tree Removal (Moderate)
Irrigation ditch	Beverly SE T15N, R24E, Sec 25	Possible Access Road Crossing (Moderate)
Irrigation ditch	Vernita Bridge T15N, R25E, Sec 31	Possible Access Road Crossing Moderate)
Irrigation Ditch	Vernita Bridge T15N, R25E, Sec 11	Possible Access Road Crossing (Moderate)
Irrigation Ditch	Coyote Rapids Sec 11	Possible Access Road Crossing (Moderate)
Saddle Mountain Lake	Coyote Rapids T14N, R26E, Secs. 20 & 29	No Impact
Columbia River	Coyote Rapids Secs. 29 and 28	No Impact

4.2.5 Alternative 3

Reminder

Segment A would have a moderate impact to wetlands.

Impacts to wetlands along Segment A would be the same as described under the Preferred Alternative (see Section 4.2.3.1, *Segment A*).

Structures along Segment C would avoid all wetlands and riparian areas. The NWI depicts 11 narrow wetlands associated with streams. Access roads may need to be constructed across most of these streams, a moderate level of impact. (See Table 4.2-6, *Segment C Impacts to NWI Mapped Wetlands*.) Floodplain impacts will be minimized by designing and placing road crossing structures to maintain existing channel properties and floodplain function. Nonetheless, placing structures such as culverts or bridges may alter flood flows, a high impact.

Table 4.2-6
Segment C Impacts to NWI Mapped Wetlands

Name (if known)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Johnson Creek	Doris T16N, R22E, Sec 20	Possible Access Road Crossing (Moderate)
Hanson Creek	Doris T15N, R22E, Sec 8	Possible Access Road Crossing (Moderate)
Cottonwood Creek	Doris T15N, R22E, Sec 21	Possible Access Road Crossing (Moderate)
Unnamed creek	Doris T15N, R22E, Sec 28	Possible Access Road Crossing (Moderate)
Creek in Alkali Canyon	Black Rock Spring NE T14N, R22E, Sec 3	Possible Access Road Crossing (Moderate)

Creek in Corral Canyon	Black Rock Spring NE T14N, R22E, Sec 15	Possible Access Road Crossing (Moderate)
Tributary to creek in Corral Canyon	Black Rock Spring NE T14N, R22E, Sec 14	Possible Access Road Crossing (Moderate)
Tributary to creek in Corral Canyon	Black Rock Spring NE T14N, R22E, Sec 23	Possible Access Road Crossing (Moderate)
Creek in Sourdough Canyon	Black Rock Spring NE T14N, R22E, Sec 25	Possible Access Road Crossing (Moderate)
Cold Creek	Cairn Hope Peak T13N, R23E, Sec 20	Possible Access Road Crossing (Moderate)
Tributary to Cold Creek	Cairn Hope Peak T13N, R23E, Sec 35	Possible Access Road Crossing (Moderate)
Dry Creek	Emerson Nipple T12N, R24E, Sec 20	No impact

4.2.6 Alternative 1A

Reminder

Segments A and B would have a moderate impact to wetlands.

Impacts to wetlands along Segment A would be the same as described under the Preferred Alternative (see Section 4.2.3.1, *Segment A*). Impacts to wetlands along Segment B (Option B_{NORTH}) would be the same as described under Alternative 1 (see Section 4.2.4.1, *Segment B*).

Structures along Segment F would avoid all wetlands and riparian areas. There are nine wetlands depicted on the NWI maps. Access roads may need to be constructed across two of these streams, a moderate level of impact. Some of the trees that line the edge of Nunnally Lake might need to be topped or removed, a moderate level of impact. Floodplain impacts will be minimized by designing and placing road crossing structures to maintain existing channel properties and floodplain function. Nonetheless, placing structures such as culverts or bridges may alter flood flows, a high impact.

Roads and structures would avoid two emergent wetland areas north of Lower Crab Creek. The wetlands along Lower Crab Creek would be spanned, but there may be trees in the riparian area that would be removed or topped, a moderate level of impact.

In the valley agricultural areas, an access road would cross an irrigation ditch that has a NWI designation and possibly a wetland, a moderate impact. (See Table 4.2-7, *Segment F Impacts to NWI Mapped Wetlands*.)

Table 4.2-7
Segment F Impacts to NWI Mapped Wetlands

Reminder

Mapped wetlands are shown on Map 5, Wetlands/Plant Associations.

Name (if known) (P=Perennial I=Intermittent)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
Nunnally Lake	Beverly	No Road Crossing (No Impact)

Name (if known) (P=Perennial I=Intermittent)	Location Quad Name Township, Range, Section	Potential Impacts (Level of Impact)
	T16N, R23E, Sec 25-36	Possible Tree Removal (Moderate)
Wetland	Beverly T16N, R23E, Sec 36	No Impact
Wetland	Beverly T16N, R23E, Sec 36	No Impact
Wetland north of Lower Crab Creek	Beverly T16N, R23E, Sec 36	No Impact
Lower Crab Creek	Beverly T16N, R23E, Sec 36	No Road Crossing (No Impact) Possible Tree Removal (Moderate)
Irrigation Ditch	Wahatis Peak T15N, R26E, Secs. 21 and 28	Possible Access Road Crossing (Moderate)
Wetland	Coyote Rapids T14N, R26E, Secs. 16 and 21	Possible Access Road Crossing (Moderate)
Saddle Mountain Lake	Coyote Rapids T14N, R26E, Secs. 20 and 29	No Impact
Columbia River	Coyote Rapids Secs. 29 and 28	No Impact

4.2.7 No Action Alternative

Current levels of disturbance to wetlands and floodplains would continue under this alternative. The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance and potential sedimentation due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. In addition, vehicle and machinery use, and vegetation management practices could contribute minor amounts of pollutants (e.g., fuel, oil, grease, rubber particulate, woody debris) that could be transported to wetlands.

4.2.8 Recommended Mitigation

If required for permit purposes, a wetland delineation would be performed for the Preferred Alternative. This delineation would provide the location and aerial extent of all wetlands and waterways along the ROW. If a permit is not required, sensitive areas would be flagged in the field for avoidance. Wetlands would be mapped, along with buffer areas to avoid direct and indirect impacts if possible.

During the design phase, efforts would be made to avoid directly impacting wetlands, riparian areas and their buffers. This would be done by placing project elements, such as structures and roads, outside wetland areas and their associated buffers, whenever a feasible upland alternative exists.

Before and during construction, the following procedures and construction practices would be adopted to ensure that designated wetland and riparian areas are not impacted:

- Workers would receive instruction in construction practices that minimize wetland impacts.
- Workers would be informed of which areas are restricted and must not be impacted.
- Restricted wetland and riparian areas would be mapped.
- The boundaries of restricted areas, such as protected wetland and riparian areas, would be flagged by a wetland scientist prior to construction, using designated flagging to ensure that workers do not unintentionally enter restricted wetland areas.
- Wetland impacts from road crossings would be minimized through proper culvert design, timing, and methods of installation.
- Indirect impacts to wetlands and waterways from sedimentation and erosion would be minimized, by erecting silt fences around areas where soil would be disturbed.
- To minimize temporary impacts, avoid compacting wet soils, and minimize harm to herbaceous vegetation, vehicle crossings of wetland areas would be restricted to the time of year when seasonal wetlands are dry or appropriate cover would be provided (for vehicular traffic) that would be removed after construction.
- BPA will work with USFWS to identify sites that are sensitive to vehicular travel during different weather conditions (e.g., to minimize rutting during muddy conditions or minimize soil and cryptogamic crust disturbance during dry conditions) and will limit travel in these areas during the time of year they are most vulnerable to disturbance.

Efforts will be made to restore wetland areas that have been disturbed by construction if disturbance is temporary. Wetland hydrology would be restored and the grade returned to pre-construction conditions where possible, as stated in the ***Section 404 Removal/Fill Permit*** for the activity. Monitoring of the reestablishment of wetland hydrology and vegetation would also take place as stated in the permit.

For Your Information

*The **Section 404 Removal/Fill Permit**: Federal permit issued by the U.S. Army Corps of Engineers that regulates wetland areas.*

Ongoing maintenance practices would be conducted with a sensitivity to the issues of wetland and riparian areas. Road grading and other disturbances to the road surface would be minimized near riparian areas. If any weeds occur along roads adjacent to wetlands and riparian areas, only herbicides approved for aquatic use would be used.

4.2.9 Cumulative Impacts

Wetlands would be impacted by any projects within the Columbia Basin that affect wetland functions and values, including the filling of wetland areas. Projects such as land development, agriculture, and pipeline development may impact wetlands in the study area. Wetland loss and floodplain impacts reduce flood storage capacity and effects water quality. As development occurs, the need for flood storage increases.

Information is available that quantifies wetland impacts in central Washington (Pers. Comm. Catherine Reed, WDOE, 2001). Between July 1, 2000 and July 1, 2001, two permits were issued in Benton, Grant, Kittitas and Yakima Counties for projects that disturbed wetlands, for a total of 0.83 acre of disturbed area. This information on the number of permitted wetland impacts may not accurately reflect wetland loss. This is partly because wetland impacts can occur illegally, outside the formal permitting process. Some people are unaware that ***ephemeral wetlands*** exist or meet wetland criteria, and fill them without permits.

For Your Information

Ephemeral wetlands *are wetlands that are only filled with water for a brief time during the spring.*

Some wetlands are created by irrigation waters along leaky canals or pipes or in outflow areas. As the acreage of lands being irrigated increases in the study area, the acreage of wetlands created by irrigation waters has increased. However, the creation of wetlands in agricultural areas does not compensate for wetland losses in terms of acreage, type, or quality of wetlands.

One of the most common types of wetland impacts in the study area are road crossings. One of the main impacts from roads crossing wetlands and waterways is the spread of weed species into previously undisturbed areas, a major problem in central Washington (Pers. Comm. Catherine Reed, WDOE, 2001).

4.3 Vegetation

4.3.1 Impact Levels

Reminder

high quality plant communities *are areas of native vegetation with little or no disturbance or exotic species.*

Impacts would be considered **high** where:

- the quantity or quality of a unique or ***high quality plant community*** would be significantly reduced.
- the substrate would be altered such that recovery of a unique or high quality plant community would not be likely.
- the diversity within a high quality native plant community would be significantly decreased.
- impacts would result in the taking of a federally listed, proposed, or candidate plant species.
- noxious weeds would be introduced into a high quality native plant community.

Impacts would be considered **moderate** where:

- native plant communities would be permanently removed through removal of plant parts and/or altering the substrate.
- the diversity within a native plant community would be decreased or the community would be degraded as a result of altering physical characteristics (e.g., increasing erosion).
- Native tree species in riparian areas would be removed or topped.
- impacts to a federally listed, proposed, or candidate plant species would not affect the viability of local populations of that species.
- impacts to rare or ***endemic*** plant species (including federal species of concern, ***BLM*** sensitive species, and state listed species) could only be partially lessened by mitigation.

Endemic *is a naturally occurring species that is limited to a particular geographic area.*

BLM*: U.S. Bureau of Land Management*

Impacts would be considered **low** where:

- native plant communities would be temporarily disturbed or altered such that natural recovery to pre-disturbance conditions would be likely.
- the life history of native plant species would be temporarily impaired through disturbance to vegetative portions, impairing the functioning of pollinator species, or decreasing reproductive potential.

- vegetation would be permanently removed from a plant community dominated by non-native species.
- a rare plant species would be temporarily impacted, but could be completely mitigated (as demonstrated through subsequent monitoring).
- the density of noxious weeds or other undesirable non-native species would be increased in areas where they were already present.

No impact would occur where:

- direct or indirect disturbance to native plant communities would be avoided.
- the habitats of rare or endemic plant species would be completely avoided.
- there would be no increase in the cover or distribution of weedy, non-native species.

4.3.2 Impacts Common to Construction Alternatives

4.3.2.1 Construction Impacts

Plant communities would be directly and indirectly impacted as a result of various project activities, and these impacts may be temporary or permanent. Some impacts to vegetation from construction activities would be fairly consistent among all the alternatives, such as the potential spread of weed species into disturbed areas.

The amount of disturbance to vegetation caused by a particular activity would depend on a variety of factors, including the type of vegetation and site characteristics (e.g., soil type, slope, elevation, ***aspect***, and amount of moisture). In general, shrub-steppe plant communities are slow to recover from disturbance. Although little is known about how well they recover or how long it takes, the effects of disturbance are well documented.

For Your Information

When referring to vegetation, ***aspect*** *is the direction a slope is facing.*

Riparian areas are particularly vulnerable to disturbance. The removal of vegetation along waterways causes an increase in water temperature, increases water velocity, and decreases wildlife habitat. Disturbance of soil in or near riparian areas may lead to erosion of stream banks, which increases the deposition of sediment into waterways. In riparian areas where trees or tall growing vegetation pose a safety hazard to transmission lines, they would need to be topped or removed (a moderate level of impact).

For Your Information

Biological crusts *are groups of living organisms that coat the soil or live just below the soil surface.*

In relatively undisturbed areas, soil disturbance decreases the soil cover provided by ***biological crusts***. Disturbance of biological crusts decreases soil fertility and increases the likelihood that an area would be invaded by non-native species. It is difficult to determine the extent of this impact, because the location and quality of biological crusts within the study area is not known. The disturbance of biological crusts in native plant communities would be a moderate level of impact.

The construction of access roads would involve clearing the proposed road area to a width of at least 25 feet. Impacts in the area of the finished roadbed and shoulder would be permanent. In the area beyond the finished roadbed, impacts would be essentially permanent in areas of shrub-steppe, because this area is not likely to recover. The construction of access roads would create a high level of impact in areas with high quality native plant communities. A moderate level of impact would result in less pristine native plant communities. In disturbed areas or in agricultural areas, the impacts to areas adjacent to roads would be temporary, and the impact level would be low to none.

Reminder

Please refer to Chapter 2, Alternatives, for further detail on project construction activities.

The construction or replacement of structures would require the removal of vegetation. The size of the cleared area would vary depending on site characteristics, but the area that may be cleared and leveled by grading would be approximately 100 by 100 feet. During construction, heavy machinery would enter the area around structures, which would compact soils. Structures are generally built on the slopes or ridges above riparian areas. Construction of structures can decrease slope stability, which can lead to degradation of plant communities on the slope and in the riparian area. Depending on the type of plant community present, the construction of structures would create a moderate to high level of impact in all segments.

Some construction-related impacts would be temporary. Heavy machinery may enter portions of the new ROW outside the cleared area during tensioning of the conductor. Although the aboveground portion of shrubs would be broken or crushed, the roots and soils would not be disturbed, and vegetation would eventually return to pre-disturbance conditions. Depending on the type of plant community present, the temporary impacts resulting from movement of vehicles would be a low to moderate level of impact in all segments.

Rare plant species may be directly or indirectly impacted by construction activities. They can be directly impacted when the plants or their habitat are destroyed or altered such that they can no longer survive. Rare plants growing outside the construction zone

may be harmed if the effects of the activities degrade their habitat. This could occur through soil erosion, decrease in slope stability, or other alterations of physical conditions that make it difficult for the species to survive. One important cause of habitat degradation is invasion by non-native species from adjacent disturbed areas. The level of impact would depend on the status of the species, and whether mitigation could be implemented to lessen the impact.

4.3.2.2 Operations and Maintenance Impacts

Access roads would need to be maintained and repaired. Maintenance vehicles traveling on access roads may contribute to the spread of weed species. Please refer to the following *Weed Invasion Impacts* (Section 4.3.2.3) for further detail. Maintenance vehicles may also need to travel off of established access roads. Because these impacts would occur in areas already impacted by construction activities, the level of impact would be low to moderate.

For Your Information

Specific impacts caused by maintenance activities are discussed in the BPA Transmission System Vegetation Management Program Final EIS (May 2000). This document focuses on the tools to be used in maintaining vegetation on BPA facilities.

4.3.2.3 Weed Invasion Impacts

After disturbance, bare land would likely be invaded by non-native species. Seeds may be blown in, transported in by animals or water, or introduced inadvertently on the clothing, equipment, or vehicles of construction or maintenance workers. Because non-native species usually lack the soil-binding characteristics of native species, cover by non-native species may result in increased erosion. This type of degradation over time can decrease the soil's ability to support a healthy native plant community (YTC Management Plan). Disturbed plant communities generally show a reduction in native plant species cover, particularly bunchgrasses and forbs (Franklin, 1973).

Some of the non-native species that invade disturbed land would be weed species. An increase in weed species, principally cheatgrass and diffuse knapweed, can be expected during the growing season following any ground disturbance within the study area (Pers. Comm. D. Stout and M. Sackschewsky, 2001).

Cheatgrass is a strong competitor that rapidly colonizes disturbed sites and once established, it outcompetes other grasses and ***forbs***. It has invaded much of the study area and would increase in density with any disturbance. Diffuse knapweed is already present in all project segments. The spread of this aggressive species is of great concern because it quickly occupies disturbed sites and tends to outcompete desirable native species. This species also moves from disturbed sites into adjacent undisturbed areas. This type of invasion can be a major threat to sensitive species habitat. Because of their poor soil-holding capabilities, knapweed species such as diffuse knapweed contribute to soil erosion (YTC Management Plan).

Reminder

*A **forb** is an herbaceous plant that is not a grass*

The use of access roads for ongoing maintenance increases the probability of weed invasion. Roads are known to contribute to the spread of noxious weeds by forming a corridor for weed dispersal. Weeds are dispersed when parts of weeds or the entire plant break off and get stuck to the undercarriages of vehicles. Weeds get dragged into new areas, and if the plant has formed seed heads, the seeds are dispersed as the vehicle travels. Because access roads cross riparian areas, weed seeds may fall into riparian areas, be dispersed by water, and beginning to grow in the moist soil. Wetlands and riparian areas are particularly susceptible to invasion by non-native species.

Introducing noxious weeds into a high quality native plant community is a high level of impact. The introduction of noxious weeds or undesirable non-native species into areas where they are already present, as in much of the study area, is a low level of impact.

4.3.3 Preferred Alternative (Alternative 2)

4.3.3.1 Segment A

Native vegetation within Segment A that would be impacted includes areas within the 26.2 miles (195.4 acres) of shrub-steppe and 1.7 miles (12.9 acres) of grasslands that occur along this segment. Impacts would be moderate to low.

Reminder

***WNHP**: Washington Natural Heritage Program*

***Federally listed, proposed, or candidate species** are species designated or in the process of being designated under the Endangered Species Act as endangered or threatened.*

***Federal species of concern** are species that may be rare or declining, but are not formally listed under the ESA.*

***Basalt lithosols** are soils with very high rock content.*

Wyoming big sagebrush/bluebunch wheatgrass, a high quality plant community tracked by the ***WNHP***, occurs along 0.2 mile of Segment A. Permanent impacts to this community caused by removal of vegetation for structures or roads would be a high level of impact. Degradation of this community through a decrease in diversity, degradation of the physical environment, or an increase in non-native species would be a moderate level of impact.

There are no known occurrences of ***federally listed, proposed, or candidate species*** along Segment A. The only species with potential habitat along Segment A is Ute ladies' tresses. However, because the habitat of Ute ladies' tresses is wetland areas, which would be avoided, there would be no direct impact to this species.

Hoover's tauschia, a ***federal species of concern***, is known to occur about 0.5 mile from the proposed ROW in ***basalt lithosols***. This habitat also occurs along Segment A. If this species occurs along the proposed line and impacts cannot be avoided, it would be a moderate impact (if impacts could only be partially lessened by mitigation) or a low impact (if successful mitigation is implemented).

Segment A crosses several sections of BLM managed land and there are occurrences of known BLM sensitive species in the area. One BLM sensitive species, Suksdorf's monkey-flower, occurs in the area of the proposed ROW and could be impacted by construction activities. Two BLM sensitive species, Pauper milk-vetch and beaked cryptantha, are known to occur within 1 mile of the proposed ROW. Because surveys have not been done by the BLM on the land they manage within Segment A, there may be other BLM sensitive species that could be impacted. Unavoidable impacts to BLM sensitive species would be a moderate level of impact if they could only be partially lessened by mitigation. The impact level would be low if successful mitigation is implemented.

The Segment A reroute would cross Cooke Canyon Creek further to the south where the riparian vegetation is less extensive, resulting in less of an impact to riparian areas than the original alignment (removing trees for conductor clearance will not be required on the reroute but may be required on the original alignment). The remainder of the area is shrub-steppe, similar to the original alignment. However, the proposed reroute is slightly longer than the original route, so slightly more shrub-steppe area would be disturbed for access road and tower construction purposes.

4.3.3.2 Segment B

The Preferred Alternative would only use Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used in this alternative.

Option B_{SOUTH} – Native vegetation that would be impacted by Option B_{SOUTH} includes 7.0 miles (63.8 acres) of shrub-steppe and 2.9 miles (26.7 acres) of grasslands. There are no high quality plant communities tracked by WNHP in Option $B_{SOUTH.}$ Impacts to plant communities would be moderate to low.

There are no known occurrences of federally listed or candidate species or potential habitat for these species within Option B_{SOUTH}. Hoover's desert parsley occurs in the immediate vicinity of Option B_{SOUTH}. If impacts to this species could not be avoided, it would constitute a moderate level of impact. Impacts could be reduced to a low level with mitigation.

B_{SOUTH} would cross the Columbia River in the same location as B_{NORTH} and would result in no impact.

4.3.3.3 Segment D

Segment D has more agricultural lands than other segments. Fewer impacts to native plant communities or rare species are expected in

agricultural lands because only remnants of native vegetation remain and rare species are unlikely to survive. Plowing and planting have destroyed most of the native vegetation in the valley, and what remains has likely been invaded by non-native species. Native vegetation that would be impacted by Segment D includes 10.1 miles (36.2 acres) of shrub-steppe and 7.2 miles (25.9 acres) of grasslands.

Bitterbrush/Indian ricegrass, a high quality plant community tracked by WNHP, occurs along 0.8 mile of Segment D. Permanent impacts to this community caused by removing vegetation for structures or roads would be a high level of impact. Degradation of this community through a decrease in diversity, degradation of the physical environment, or an increase in non-native species would be a moderate level of impact.

A known occurrence of Umtanum buckwheat, a federal candidate species, is located near Segment D on part of Umtanum ridge. This ridge may also be habitat for basalt daisy, a federal candidate species that grows in crevices in basalt cliffs on canyon walls. Roads would not be built in the steep, rocky terrain of Umtanum ridge, but it is possible that structures could be placed in habitat areas. Because Umtanum buckwheat grows in a narrow strip (generally less than 100 feet wide) west of the proposed line, habitat areas would be avoided. Indirect impacts could be avoided by placing structures outside the habitat area or replacing existing structures (double-circuiting) in this portion of the line. Because direct impacts will be avoided, the project will have a moderate to low impact on Umtanum wild buckwheat.

Wetlands are potential habitat for Ute ladies' tresses (threatened species). The floodplain of the Columbia River is habitat for northern wormwood (candidate species). Because wetlands and the area immediately adjacent to the Columbia River would be avoided, there would be no impact to this species.

Four federal species of concern occur in the immediate vicinity of Segment D: Columbia milk-vetch, persistentsepal yellowcress, gray cryptantha, and Hoover's desert parsley. If impacts to these species cannot be avoided, it would constitute a moderate level of impact. Impacts could be reduced to a low level through mitigation.

A small amount of BLM managed land is located within Segment D. There are several known occurrences of BLM sensitive species within the study area. If impacts to these species cannot be avoided, it would be a moderate level of impact. Impacts could be reduced to a low level if successful mitigation is implemented. Mitigation could include placement of structures and roads to avoid populations, timing restrictions, or transplantation, if feasible.

In the area of the new Wautoma Substation, all vegetation would be permanently removed from an area 850 by 500 feet in size. Because this area is grassland dominated by non-native species with no occurrences of rare species, building the substation would be a low level of impact to vegetation.

Impacts to shrub-steppe and grassland communities along Segment D would be moderate to low.

4.3.4 Alternative 1

Impacts to vegetation to Segments A would be the same as described for the Preferred Alternative (see Section 4.3.3.1, *Segment A*).

Reminder

Impacts to vegetation from Segments A and B include:

- *No impact to T&E species*
- *Moderate to low impact to shrub-steppe and grassland communities*
- *High impact to Wyoming big sagebrush/bluebunch wheatgrass plant community*

4.3.4.1 Segment B

Alternative 1 would follow Option B_{NORTH} only and would not use Option B_{SOUTH}.

Option B_{NORTH} – Native vegetation that would be impacted by Option B_{NORTH} includes 6.2 miles (56.3 acres) of shrub-steppe and 2.9 miles (26.2 acres) of grasslands. There are no high quality plant communities tracked by WNHP in Option B_{NORTH}. Impacts to plant communities would be moderate to low.

Potential habitat for northern wormwood, a candidate species, occurs in the floodplain of the Columbia River. Because structures would be placed well outside the habitat area for this species, there would be no impacts. There is no potential habitat for other federally listed, proposed, or candidate species.

Two federal species of concern, Columbia milk-vetch and gray cryptantha, are known to occur within 0.25 mile of the proposed project. If impacts could not be avoided, a moderate level of impact would occur if full mitigation could not be implemented. Impacts could be reduced to a low level if mitigation is successful.

There would be no impacts to BLM sensitive species along Option B_{NORTH}.

4.3.4.2 Segment E

Native vegetation within Segment E that would be impacted includes 12.9 miles (112.4 acres) of shrub-steppe and 3.9 miles (34.1 acres) of grassland. Impacts to shrub-steppe and grassland plant communities would be moderate to low.

A high priority plant community, Bitterbrush/Indian ricegrass shrubland is found along a 2.8-mile stretch. Permanent impacts caused by removing vegetation for structures or roads would result in a high impact. Degradation of the community through a decrease in diversity, degradation of the physical environment, or an increase in non-native species would have a moderate impact.

There are no documented occurrences of federally listed species along Segment E, however, wetlands along Lower Crab Creek and in the valley are potential habitat for Ute ladies' tresses and the Columbia River floodplain is habitat for northern wormwood. Because wetlands and the area immediately adjacent to the Columbia River would be avoided, there would be no impact to these species.

Two federal species of concern occur in the immediate vicinity of Segment E: Hoover's desert-parsley and gray cryptantha. If impacts to these species could not be avoided, this would constitute a moderate level of impact. Impacts could be reduced to a low level with mitigation.

There are several known occurrences of BLM sensitive species within Segment E. Species that might be impacted by construction activities include the federal species of concern Nuttall's sandwort, and other BLM sensitive species that have potential habitat within the study area. If impacts to these species could not be avoided, on BLM managed lands, it would be a moderate level of impact. Impacts could be partially lessened by mitigation.

Reminder

Impacts to vegetation from Segment A include:

- *No impact to T&E species*
- *Moderate to low impact to shrub-steppe and grassland communities*
- *High impact to Wyoming big sagebrush/bluebunch wheatgrass plant community*

4.3.5 Alternative 3

Impacts to Segment A would be the same as described for the Preferred Alternative (see Section 4.3.3.1, *Segment A*).

Native vegetation along Segment C that would be impacted includes 22.1 miles (316.5 acres) of shrub-steppe and 7.5 miles (107.0 acres) of grasslands. Impacts to shrub-steppe and grassland plant communities would be moderate to low. There are no high quality plant communities tracked by WNHP in Segment C.

There are no known occurrences of federally listed or candidate species along Segment C. Some structures might be located on basalt cliffs within Segment C, which could provide habitat for basalt daisy (candidate species). If basalt daisy is present and habitat areas could not be avoided, this would be a moderate to high level of impact, depending on whether mitigation can be implemented.

Columbia milk-vetch (species of concern) occurs in the immediate vicinity of the Segment C route. This species could be impacted by construction activities. If this species could not be avoided, it would constitute a moderate level of impact if full mitigation could not be implemented, or a low level if fully mitigated.

A small amount of BLM managed land (less than 0.25 mile) is located within Segment C. There are several known occurrences of BLM sensitive species along the proposed ROW. Impacts to BLM sensitive species would be a moderate level of impact if the impacts could only be partially lessened by mitigation or a low level if successful mitigation is implemented.

Impacts at the new Wautoma Substation would be the same as discussed in the Preferred Alternative.

4.3.6 Alternative 1A

Impacts to vegetation to Segment A would be the same as described for the Preferred Alternative (see Section 4.3.3.1, *Segment A*), and impacts to Segment B (Option B_{NORTH}) would be the same as described for Alternative 1 (see Section 4.3.4.1, *Segment B*).

Native vegetation within Segment F that would be impacted includes 23.0 miles (173.0 acres) of shrub-steppe and 7.8 miles (58.3 acres) of grassland. Impacts to shrub-steppe and grassland plant communities would be moderate to low.

As in Segment D, Bitterbrush/Indian ricegrass shrubland, a high quality plant community tracked by WNHP, occurs along 0.8 mile of Segment F. Impacts would be high to moderate, as discussed in Segment D.

There are no known occurrences of federally listed or candidate species along Segment F. Similar to Segments D and E, wetlands along Lower Crab Creek and in the valley are potential habitat for Ute ladies' tresses, and the Columbia River floodplain is habitat for northern wormwood. Because wetlands and the area immediately adjacent to the Columbia River would be avoided, there would be no impact to these species.

One species of concern, Hoover's desert parsley, occurs in the vicinity of the proposed line. A lichen *(Texosporum santi-jacobi)* species (federal species of concern) could also occur in this area. If impacts to these species could not be avoided, it would constitute a moderate level of impact. Impacts could be reduced to a low level with mitigation.

Reminder

Impacts to vegetation along Segments A and B include:

- *No impact to T&E species*
- *Moderate to low impact to shrub-steppe and grassland communities*
- *High impact to Wyoming big sagebrush/bluebunch wheatgrass plant community*

There are 12.8 miles of BLM managed land within Segment F, along the south slope of the Saddle Mountains. Known occurrences of three BLM sensitive species, Hoover's desert-parsley, Piper's daisy, and dwarf evening primrose could be impacted by project activities. Other BLM sensitive species with the potential to occur in this area include gray cryptanthera, Wanapum crazyweed, Geyer's milk-vetch, bristle-flowered collomia, blue cup, Nuttall's sandwort, Canadian St. John's wort, tufted evening-primrose, and the lichen species *Texosporum santi-jacobi.* If impacts to BLM sensitive species could not be avoided, it would be a moderate level of impact. Impacts could be partially lessened by mitigation.

4.3.7 No Action Alternative

The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. No new impacts to vegetation are expected as a result of this alternative.

4.3.8 Recommended Mitigation

4.3.8.1 Site-Specific Surveys

To determine whether rare species occur along the Preferred Alternative, a survey of known and potential habitat would be done prior to construction.

Rare plant surveys were initiated in August 2001 to identify late-blooming rare species and to search for potential habitat for other rare species habitat to be surveyed in 2002. A professional botanist skilled at identifying plants in the Columbia Basin, has been retained to conduct rare plant surveys during the correct time of year to identify the species with the potential to occur in each area. The survey would be done at a level of intensity to ensure that if rare species are present, it is likely they would be found. If rare plant species are found, the boundaries of the occurrence would be accurately mapped on aerial photographs and located by **GPS** so they can be accurately depicted on project maps. Basic information on rare plant communities would be collected in order to identify any high quality native plant communities that are not within the WNHP database.

➡ Reminder

***GPS**: Global Positioning Systems*

4.3.8.2 Native Plant Communities

High quality native plant communities would be avoided where possible and impacts to these communities would be minimized by

locating structures and roads outside them, where possible. Maps of high quality communities would be provided to engineers designing the proposed line. Impacts to native plant communities would be minimized during construction by implementing the following practices:

- Construction activities would be restricted to the area needed to work effectively. Construction crews would be instructed to restrict vehicles to designated areas.
- Designated areas would be used to store equipment and supplies. The contractor would follow state and federal regulations to protect plant communities.
- In areas of known sensitive species, topsoil would be stockpiled when the footings of structures are put in place or an area for placement of a structure is graded. After construction, the topsoil would be replaced on the surface of the soil and the surface would be restored to the former grade, where possible.
- After construction, disturbed areas not needed for ongoing access or maintenance would be reseeded.
- Construction specifications would designate which species are appropriate for reseeding in certain areas. Inquiries would be made to determine which commercially available native seed has been used with some success. The option of using non-invasive, non-natives would be explored.

4.3.8.3 Rare Species

Rare plant species habitat would be avoided if possible and unavoidable impacts would be minimized as much as possible. Maps of all rare species occurrences would be provided to engineers designing the proposed line. Structures and roads would be placed to avoid impacting rare species occurrences if possible. Impacts to rare species would be minimized during construction and subsequent maintenance, by implementing the following practices:

- Boundaries of rare species populations would be flagged in the field with an appropriate buffer, to ensure areas that are designated to be avoided during construction are not impacted.
- If impacts are temporary, it may be sufficient to restrict the time of year that various activities take place. Many plants in the study area flower and fruit very early in the spring, then remain dormant under the ground for much of the year. The underground parts may not be disturbed during certain time

periods by certain types of activities, such as driving through an area.

- Information on rare plant species occurrences would be given to BPA maintenance personnel to be considered during the planning and implementation of future maintenance activities. The location of rare plant occurrences would be placed on BPA maps and documents so that maintenance personnel are aware of their location. A written description of restrictions, precautions, or special procedures within rare plant habitat would be attached to maps and documents for that area.
- On state and federal land where rare plants are known to occur, the procedures used to control weeds would be restricted to those that minimize harm to rare plant species. The decision on the best actions to take to control weeds would be made on a case-by-case basis with consultation with the respective state or federal land manager.

4.3.8.4 Minimize the Introduction and Spread of Weeds

Throughout the project, efforts would be made to minimize the introduction or spread of weeds, by implementing the following activities and practices. These activities and practices would be included in a Weed Management Plan for this project:

Reminder

This document is available for review on the Web at http://www.efw.bpa.gov/cgi-bin/PSA/NEPA/SUMMARIES/VegetationManagement_EIS0285.

- To determine the extent of the weed problems along the Preferred Alternative, a pre-construction weed survey would be done to document current conditions.
- Some weed control or eradication activities may occur prior to construction or even during the weed survey if construction would exacerbate an existing weed problem.
- After construction, the seeding of disturbed areas would help decrease weed invasion by providing competition for space.
- A post construction weed survey would be done so that pre- and post-construction weed distributions can be compared. If weed problems exist or are increasing over pre-construction conditions, BPA would cooperate with county weed boards or federal land management agencies to eradicate or control any species that invade disturbed areas.
- To control weeds, BPA would use the procedures outlined in the BPA's *Transmission System Vegetation Management Program Record of Decision* (August 2000) to address weed problems in subsequent maintenance activities.

- Because weeds can be spread by vehicles, BPA would restrict access to the newly constructed access roads where possible, by using gates.

4.3.9 Cumulative Impacts

Reminder

Cumulative Impacts *are created by the incremental effect of a specific action when added to other past, present, or reasonably foreseeable future actions.*

DNR*: Washington State Department of Natural Resources*

The loss of shrub-steppe may result from a myriad of projects within the Columbia Basin that involve clearing land and converting it to other uses. The loss of shrub-steppe in Washington State attributable to agriculture has been estimated at 60 percent (Dobler, 1992, Columbia Basin Ecosytem Management Project, EOE-RL, 1996). Due to the high value of some agricultural lands in the study area, the loss of shrub-steppe has accelerated. Within the study area, the ***DNR*** continues to offer leases to state-owned lands for agricultural uses. In Washington, the continued loss of shrub-steppe in the next 50 years is projected to be high (Andelman and Stock, 1994).

Impacts to rare plant species on federal lands may occur due to land use such as grazing or training exercises, but it likely that federal agencies will prioritize the protection of rare species habitats. Much of the rare plant species habitat managed by federal agencies within the study area is relatively inaccessible. Environmental documents produced by these agencies address the needs of rare plant species and staff members are assigned to deal with rare plant issues.

Rare plant species in private areas receive little to no protection under federal and state rare and endangered species legislation. Rare species may be impacted by a variety of land uses typical of private lands, including farming, ranching and development.

The project would contribute to the spread of weeds in the study area as a result of ground disturbance. The invasion by weeds is considered one of the biggest threats to biodiversity in the study area (TNC, 1999). Continued invasion by weed species would accelerate as development occurs and as new weed species invade the area.

4.4 Wildlife

4.4.1 Impact Levels

Reminder

*A **take** is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.*

*To **harm** is to injure directly, or cause significant habitat modification or degradation that results in death or injury to a species.*

High impacts would occur when an action creates a significant adverse change in wildlife habitat, populations, or individuals. High impacts may result from actions that:

- cause the ***take*** of a federally listed or proposed threatened or endangered wildlife species.
- cause a significant reduction in the population, habitat or viability of a federal or state listed wildlife species of concern or sensitive wildlife species, which would result in trends towards endangerment or the need for federal listing.
- cause a significant long-term (more than two years) reduction in the quantity or quality of habitat critical to the survival of local populations of common wildlife species.
- ***harm*** or kill a significant number of individuals of a common wildlife species.

Moderate impacts would occur when an action creates a moderate adverse change in wildlife habitat, populations or individuals. Moderate impacts may result from actions that:

- create an effect on federally listed or proposed threatened or endangered wildlife species that could be partially mitigated.
- cause a reduction in the population, habitat or viability of a federal or state listed wildlife species of concern or sensitive wildlife species, without resulting in trends towards endangerment or the need for federal listing.
- harm or kill a small number of individuals of a common wildlife species.

Low impacts would occur when an action creates a minor adverse change in wildlife habitat, populations or individuals. Low impacts may result from actions that:

- create an effect on federally listed or proposed threatened or endangered wildlife species that could be largely or completely mitigated (i.e., seasonal restrictions on construction activities) or are temporary and benign (i.e., temporary disturbance by construction noise).
- cause a minor short-term (less than two years) reduction in the quantity or quality of the habitat of a federal or state listed wildlife species of concern or sensitive wildlife species,

without resulting in trends towards endangerment and/or the need for federal listing.

- cause a significant short-term (less than two years) reduction in the quantity or quality of habitat critical to the survival of local populations of common wildlife species.

Minimal impacts would occur when an action creates a temporary or minor adverse change in wildlife habitat or individuals. Minimal impacts may result from actions that:

- cause a temporary (less than two weeks) disturbance or displacement of a federal or state listed wildlife species of concern or sensitive wildlife species.
- cause a short-term (less than one year) disturbance or displacement of a common wildlife species.

No impacts would occur when an action has no effect or fewer impacts than the minimal impact level on wildlife habitat, populations or individuals.

4.4.2 Impacts Common to Construction Alternatives

The construction, operation, and maintenance of the proposed transmission line would impact wildlife populations residing in or near the proposed study area. The extent of impact would depend on the species, habitat requirements, and availability of suitable habitat in and around the construction and ROW area.

4.4.2.1 Construction Impacts

Construction impacts can be generally categorized as short-term disturbances related to construction noise, dust, human intrusion, or long-term physical habitat changes or harm to individual animals.

Short-term construction disturbances, depending on the time of year and location, could impact a wide variety of species including mule deer, elk, wintering bald eagles, passerine bird species, waterfowl, raptors, small rodents and amphibian species. Nesting raptors are easily disturbed by construction noise and human presence, and may abandon their nests if the disturbance is severe. Short-term disturbance of a federally listed species may constitute a take, which is considered a high impact. However, with mitigation (e.g., construction timing restrictions), short-term construction-related disturbances would result in only low or minimal impacts to wildlife species.

Long-term construction impacts would mostly stem from habitat loss, due to clearing for ROW or roads. Clearing would mostly impact species that use shrub-steppe habitats, although some limited areas of riparian vegetation may need to be removed. Clearing would be required for structure sites, new substations, expanded substations and access roads.

In areas of relatively undisturbed, native shrub-steppe habitat, clearing would constitute a high impact, because high value habitat for state or federally listed shrub-steppe-dependant species (e.g., sage sparrows, sage thrashers and loggerhead shrikes) would be reduced. In areas of degraded shrub-steppe vegetation (e.g., vegetation infested with weed species), clearing would constitute a moderate impact, since the habitat is already degraded. Clearing in areas previously cleared or severely disturbed (such as agricultural lands) would result in minimal impacts to wildlife species.

Clearing areas of native shrub-steppe vegetation, especially linear corridors such as roads can increase the risk of predation for shrub-steppe dependant small mammal, reptile and bird species. With less cover available and an easy corridor for predators to travel into previously unbroken habitat, these species can be at increased risk of predation from coyotes, raptors, and other predators (Brunkal, 2001). Species most susceptible to increased predation include jackrabbits, sagebrush voles, sagebrush lizards, striped whipsnakes, nightsnakes, and sage grouse.

Riparian areas are generally located in narrow strips along small streams and often in canyons. Since the proposed transmission line would either span these narrow areas or would be located upslope of stream channels, little or no riparian vegetation would need to be removed for transmission line clearance and structure construction. However, since riparian areas are extremely important wildlife habitat, clearing riparian vegetation for ROW or access road construction would cause moderate to high impacts to wildlife species, by disrupting movement corridors, removing nesting or foraging habitat, and compacting stream banks.

4.4.2.2 Operation and Maintenance Impacts

Impacts to wildlife from the operation and maintenance of the proposed project are generally related to the temporary disturbance of wildlife (caused by maintenance equipment and human presence), or the physical presence of the structures.

Maintenance Impacts – Maintenance of the proposed project may include periodic vehicle and foot inspections, helicopter surveys, structure and line repair, clearing of ROW, and other disturbances. Depending on the time of year and the location, maintenance activities could impact a wide variety of species, including mule deer, elk, wintering bald eagles, passerine bird species, waterfowl, raptors, small rodents and amphibian species. Raptors frequently use transmission line structures for nesting and perch sites, and because the towers are the tallest part of the landscape, they may be the preferred hunting site for some species. Nesting raptors are easily disturbed by equipment noise and human presence and may abandon their nests if the disturbance is severe. Periodic ROW clearing would be limited to riparian areas, where the impact would be high.

Operation and Avian Collision Impacts – Operation of the proposed project would have the greatest impact on bird species, due to the collision threat posed by structures, transmission lines, and ground wires. Most other wildlife species would not be as significantly impacted, since the presence of the transmission lines, structures, and access roads generally does not present barriers to migration, create excessive noise, or otherwise cause major behavior changes. Some species with small home ranges or limited dispersal ability might experience a greater negative impact.

Some bird species, usually waterfowl, are prone to collisions with powerlines, especially the grounding wires located at the top of the structures (Meyer, 1978, James and Haak, 1979, Beaulaurier, 1981, Beaulaurier et al., 1982, Faanes, 1987). Four main factors influence avian transmission line collisions: the current level of risk, power line configuration, amount of bird use in a particular area, and the tendency of certain bird species to collide with wires. Collisions usually occur near water or migration corridors and more often during inclement weather. Raptor species are less likely to collide with power lines, perhaps due to their excellent eyesight and tendency to not fly at dusk or in low visibility weather conditions (Olendorff and Lehman, 1986). Smaller migratory birds are at risk, but generally not as prone to collision because of their small size, their ability to quickly maneuver away from obstacles, and the fact that they often migrate high enough above the ground to avoid transmission lines. Permanent-resident birds that fly in tight flocks, particularly those in wetland areas, may be at higher risk than other species.

4.4.3 Preferred Alternative (Alternative 2)

The Preferred Alternative would include Segment A, Segment B (Option $B_{SOUTH)}$ and Segment D.

4.4.3.1 Segment A

Along Segment A, approximately 208 acres of shrub-steppe and grassland vegetation would need to be cleared for structure sites and access roads. Also, approximately 5 acres of forest vegetation, including some riparian vegetation, would need to be cleared.

Riparian vegetation removal would constitute a high impact to wildlife, since riparian areas are scarce and provide important habitat to species such as bald eagles and Lewis' woodpeckers.

Nesting habitat for sagebrush obligate species such as the sage sparrow and sage thrasher would be removed, as would known nesting habitat for long-billed curlew (moderate impact). Sharp-tailed grouse have been documented in the past near the west end of Segment A, and if they still exist, would be moderately impacted by vegetation removal. Sage grouse are known to exist in the southern end of this segment, although no occurrences have been documented closer than 1 mile from the proposed ROW. Disturbance to sage grouse from vegetation removal and construction noise may result from this project (moderate to high impact).

The increase in risk to raptors, waterfowl, and passerine bird species from collision with transmission lines and structures would be low, since no major migration corridors or bodies of water are located along this segment (minimal impact). If the project were constructed during the winter, the potential for disturbing roosting bald eagles (threatened species) would be high near the Wilson and Naneum Creek crossings (high impact).

Also, wintering deer and elk might be temporarily disturbed by construction noise and activity (minimal impact). However, the increase in potential habitat for perching raptors may cause an increase in predation risk for shrub-steppe dependent animals, a moderate impact.

The Segment A reroute would have the same impacts to wildlife species as the original alignment discussed above.

4.4.3.2 Segment B (Option B_{SOUTH})

The Preferred Alternative would follow Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used for this alternative.

Approximately 90.4 acres of shrub-steppe and grassland vegetation would need to be cleared for structure sites and access roads along Segment B (Option B_{SOUTH}). If the new line was constructed during the winter, the potential for disturbing roosting bald eagles (threatened species) would be high near the Columbia River crossing (high impact). In the upland areas, wintering deer and elk might be disturbed by construction activity (minimal impact). Sage grouse are known to exist near the western end of this segment and might be impacted (moderate to high impact). Nightsnakes have been observed near the proposed ROW and might be impacted (minimal impact). Near the Columbia River, waterfowl, pelicans, and other birds using the area as a migration corridor might be at increased risk of collision with the transmission line spanning the river (moderate impact).

4.4.3.3 Segment D

Segment D has the most varied terrain, and thus the most diverse group of habitats of all the proposed segments. Approximately 62 acres of shrub-steppe and grassland habitat would need to be cleared for structure sites and access roads. Segment D crosses Lower Crab Creek and the Columbia River, which are both migration corridors for birds and areas of high waterfowl concentrations. The risk of avian collisions would be increased in these areas, although the proposed line would be located adjacent to an existing line (moderate impact). The Saddle Mountains have documented occurrences of nesting prairie falcons and golden eagles that could be disturbed by construction activities (low impact). Other species in the Saddle Mountains include the striped whipsnake, chukar, passerine bird species, and a variety of small mammals. Impacts to these species would be moderate, due to the removal of shrub-steppe and dwarf shrub-steppe plant communities.

Segment D crosses the Wahluke Slope over mostly agricultural lands, with no native shrub-steppe habitat present. Construction and operation of the project in this section of the proposed segment would have no impact on species that depend on shrub-steppe habitat and would have minimal to no impact on other wildlife species.

The southern third of Segment D crosses the Columbia River and climbs over Umtanum Ridge. On the steep north face of Umtanum Ridge, nesting prairie falcons and other raptor species have been documented. Swainson's hawks, loggerhead shrikes, and burrowing owls have all been documented nesting near or on the proposed ROW south of Umtanum Ridge. Clearing in this area would cause high impacts to burrowing owls and moderate impacts to other shrub-steppe-dependant species. In addition, the southern end of the

proposed line crosses the Cold Creek wildlife migration corridor, which is one of the most important bird migration corridors in Washington and an important corridor for wildlife migrating between the YTC and the Hanford Site. Disturbance to this area could disrupt the migration patterns of these species and increase the hazard of avian collisions with transmission lines and structures (moderate impact).

Reminder

Impacts to wildlife would be moderate to high along Segments A and B.

4.4.4 Alternative 1

Alternative 1 would include Segment A, Segment B (Option B_{SOUTH}) and Segment E.

Impacts to wildlife and wildlife habitat along Segment A would be the same as described for the Preferred Alternative (see Section 4.4.3.1, *Segment A*).

4.4.4.1 Segment B (Option B_{NORTH})

Alternative 1 would follow Option B_{NORTH} of Segment B. Option B_{SOUTH} would not be used for this alternative. Approximately 82.4 acres of shrub-steppe and grassland vegetation would need to be cleared for structure sites and access roads along Segment B (Option B_{NORTH}). Impacts to wildlife species present along Option B_{NORTH} are similar to those discussed under Segment B in the Preferred Alternative (see Section 4.4.3.2, *Segment B (Option B_{SOUTH})*)

4.4.4.2 Segment E

Along Segment E, approximately 147 acres of shrub-steppe and grassland habitat would need to be cleared for structure sites and access roads. Segment E crosses Lower Crab Creek and the Columbia River, which are both migration corridors for birds and areas of high waterfowl concentrations. The risk of avian collisions would be increased in these areas, although the proposed line would be located adjacent to an existing line (moderate impact). The Saddle Mountains have documented occurrences of nesting prairie falcons and golden eagles that could be disturbed by construction activities (low impact). Other species in the Saddle Mountains include the striped whipsnake, chukar, passerine bird species, and a variety of small mammals. Impacts to these species would be moderate, due to the removal of shrub-steppe and dwarf shrub-steppe plant communities. The upper edge of the Wahluke Slope, just below the Saddle Mountains crest where the line heads southeast, has not been converted to agriculture and remains shrub-steppe. Shrub-steppe-dependant species in this area would be moderately impacted. The line crosses the remainder of the Wahluke Slope over mostly agricultural lands that have little native shrub-steppe habitat present. Construction and operation of a new

line in this section of the proposed segment would have no impact on species that depend on shrub-steppe habitat, and minimal to no impact on other wildlife species. The project may have a low positive impact for raptor species due to an increase in nesting, perching, and roosting habitat.

The shrub-steppe habitat in the Hanford Site is relatively undisturbed, although invasive, species are present due to past grazing practices. A herd of mule deer, uncommon in the central shrub-steppe region, is present in this area and may be disturbed by construction activity (low impact). Shrub-steppe-dependant species such as the sage sparrow would be disturbed by construction and habitat removal during clearing (moderate impact). Burrowing owls have been documented near the proposed line and may be impacted by clearing and construction (moderate impact). Raptors (including Swainson's hawks) are present. A new line might have a low positive impact for raptors, since the towers are the tallest structures within many miles and make excellent perching, roosting, and nesting habitat. However, the additional habitat available for perching raptors could increase the predation risk for small shrub-steppe dependent species such as sage sparrows, sage thrashers, mice, and voles, a moderate impact.

A large wetland complex called Saddle Mountain Wasteway, just west of Segment E, is home to great numbers of waterfowl, great blue herons, and other wetland species. The new line would cross a channel and the associated wetland complex leading east from the lake. Woodhouse's toads have been documented in large numbers within this area and might be impacted (low impact). The proposed line would avoid the riparian area (minimal impact to riparian species), but increase the collision hazard for waterfowl and other bird species (moderate impact). The crossing over the Columbia River into the Hanford Substation would also increase the collision hazard for waterfowl and other bird species using the migration corridor (moderate impact).

4.4.5 Alternative 3

Reminder

Impacts to wildlife would be moderate along Segment A.

Alternative 3 would include Segment A and Segment C.

Impacts to wildlife and wildlife habitat along Segment A would be the same as described for the Preferred Alternative (see Section 4.4.3.1, *Segment A*).

4.4.5.1 Segment C

Along Segment C, approximately 424 acres of shrub-steppe and grassland habitat would need to be cleared for structure sites and

ınd
ıent B.

access roads. Sage grouse, burrowing owls, wintering bald eagles, and loggerhead shrike are all known to be present near the proposed ROW, and would be impacted by construction of the new line (high impact). The southern end of the segment crosses Cold Creek, which one of the most important bird migration corridors in Washington. The southern portion is also an important area for deer, elk, coyote, jackrabbit, and other species migrating between the YTC and the Hanford Site. Disturbance to this area could disrupt the migration patterns of these species, and increase the hazard of avian collisions with transmission lines and structures (moderate impact).

4.4.6 Alternative 1A

Alternative 1A would include Segment A, Segment B (Option B_{NORTH}) and Segment F.

Impacts to wildlife and wildlife habitat along Segment A would be the same as described for the Preferred Alternative (see Section 4.4.3.1, *Segment A*). Impacts to wildlife and wildlife habitat along Segment B (Option B_{NORTH}) would be the same as described for Alternative 1 (see Section 4.4.4.1, *Segment B (Option B_{NORTH})*.

4.4.6.1 Segment F

Along Segment F, approximately 231.3 acres of shrub-steppe and grassland habitat would need to be cleared for structure sites and access roads.

Impact levels in the area between the Vantage Substation and the crest of the Saddle Mountains would be similar to those described for Segments D and E. Below the crest of the Saddle Mountains, the area is relatively undisturbed, with the exception of historic grazing and some motorized recreation activities. A historic sage grouse sighting was made near the study area, and a possible historic (pre-1978) Washington ground squirrel colony was located in the general vicinity of the proposed ROW. The top of the Saddle Mountains is a historic sage grouse corridor. If either of these species are still present, construction and clearing of the project would cause a high impact to them.

From the Saddle Mountains, Segment F cuts south across the Wahluke Slope. This section of the Wahluke Slope is not used for agriculture and is relatively undisturbed shrub-steppe habitat. Swainson's hawks are known to nest along this section and might be positively impacted by construction and operation of the project (low positive impact). Other shrub-steppe-dependant wildlife species would be moderately impacted by removal of shrub-steppe vegetation during structure placement and road clearing.

After crossing Highway 24, Segment F enters the Hanford Site. The impacts to wildlife in this area would be similar to those impacts associated with Segment E.

4.4.7 No Action Alternative

The No Action Alternative would not change any existing conditions, and therefore would have no impact on wildlife species. The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized disturbance to wildlife and habitat due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. No new impacts to wildlife and wildlife habitat are expected as a result of this alternative.

4.4.8 Threatened and Endangered Species

This section describes the impacts that the proposed project would have on the four wildlife species that are either federally listed or proposed for listing: the bald eagle, Mardon skipper, Washington ground squirrel, and sage grouse. A Biological Assessment is being prepared separately, and determination of the effects for each of these species will be presented in that document. The effects determination will be included in the final EIS document.

4.4.8.1 Bald Eagle

Bald eagles are not known to nest within the study area. Wintering bald eagles are present in the area north of Ellensburg near Wilson and Naneum creeks, in the YTC near Hanson and Alkali Canyon Creeks, and near the Columbia River crossings at Vantage, Midway and the Hanford Site. Construction near known bald eagle roost sites might disturb wintering bald eagles (high impact). In areas away from roost sites, the disturbance of bald eagles from construction will result in a minimal impact. It is unlikely that eagle habitat would be removed. With mitigation, the proposed project would have no impact on bald eagles.

4.4.8.2 Mardon Skipper

The closest known location of historic and current Mardon skipper populations is approximately 50 miles southwest of the study area. The Ponderosa pine/fescue habitat type that the Mardon Skipper favors does not occur within the study area boundaries, although this habitat type may exist near the northern end of the study area. The project would have no impact on the Mardon Skipper.

4.4.8.3 Washington Ground Squirrel

The Washington ground squirrel is listed as both a state and federal species of concern. Much of the study area is located west of the Columbia River, outside of the Washington ground squirrels' known historic range. One historical occurrence (pre-1978) was noted near Segment F in the Saddle Mountains (Betts, 1990). The nearest known existing population is approximately 5 miles east of Segment F north of the Saddle Mountains crest (Nature Conservancy, 2001). Suitable Washington ground squirrel habitat may exist within the study area east of the Columbia River, especially near Lower Crab Creek (Hill, 2001) and the Wahluke Slope (Nature Conservancy 2001). If Washington ground squirrel colonies exist within or adjacent to the study area, construction of a new line and access roads would cause a high impact. If no colonies exist, there would be no impact. With mitigation, construction of a new line and access roads would have a moderate or low impact on any Washington ground squirrel colonies that might exist within the study area.

4.4.8.4 Sage Grouse

For Your Information

*A **lek** is an open area where sage grouse gather in the spring to perform courtship dances.*

The sage grouse is a candidate for federal listing. The Washington Department of Fish and Wildlife (WDFW) lists the sage grouse as threatened. In Washington, sage grouse have historically ranged from the Columbia River, north to Oroville, west to the foothills of the Cascades, and east to the Spokane River. Within the study area, they are known to exist within each of the six drainages in the YTC that are crossed by sections of Segments A, B, and C. Sage grouse are known to nest in the Alkali Canyon and Corral Canyon drainages. A historic ***lek*** in the Johnson Creek drainage has not been used since 1987. Most of the core sage grouse habitat in the YTC is west of the proposed route. Historic sage grouse migration corridors exist along the top of the Saddle Mountains and along Cold Creek, although they have not been sighted in the Saddle Mountains area recently. Construction of Segments A, B, and C would cause a high impact to sage grouse. Construction of Segments D, E, and F would cause a low impact. With mitigation, construction of Segments A and B would cause a moderate impact to sage grouse. Segment C, since it crosses core sage grouse habitat through relatively undisturbed shrub-steppe, could not be mitigated, and would be a high impact.

4.4.9 Special Status Species

Table 4.4-1, *Impacts to Special Status Species*, lists state and federal special status species that may be present within each segment of the proposed study area and indicates the possible impact the project may have on them.

Table 4.4-1
Impacts to Special Status Species

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Birds						
Aleutian Canada goose	FT[1]	ST	B, D, E, F	M	M	M
Bald eagle	FT	ST	ALL SEGMENTS	W	H	L
Golden eagle		SC	B, C, D, E, F	B	M	L
Ferruginous hawk	FSC	ST	ALL SEGMENTS	B	M	L
Swainson's hawk		SM	ALL SEGMENTS	B	M	L
Northern goshawk	FSC	SC	ALL SEGMENTS	M	N	N
Peregrine falcon	FSC	SE	C, D, E, F	B	L	L
Swainson's hawk		SM	ALL SEGMENTS	B	M	Mn
Osprey		SM	B, D, E, F	B	L	Mn
Prairie falcon		SM	ALL SEGMENTS	B	M	Mn
Turkey vulture		SM	B, D, E, F	B	L	Mn
Burrowing owl	FSC	SC	C, D, E, F	B	H	M
Northern Spotted Owl	FT	SE	NONE	N	N	N
Lewis' woodpecker		SC	A, C, D, E, F	B	M	L
Sage sparrow		SC	ALL SEGMENTS	B	H	M
Sage thrasher		SC	ALL SEGMENTS	B	H	M
Loggerhead shrike	FSC	SC	ALL SEGMENTS	B	M	M
Long-billed curlew	FSC	SM	A, C, E, F	B	H	M
Western bluebird	FSC	SM	ALL SEGMENTS	B	M	M
Ash-throated flycatcher	FSC	SM	NONE	N	N	N
Olive sided flycatcher	FSC		ALL SEGMENTS	P	M	L
Little Willow flycatcher	FSC		ALL SEGMENTS	P	M	L
Grasshopper sparrow	FSC	SM	C	B	M	M
Western sage grouse	FSC	ST	A, C, F	B	H	M
Sharp tailed grouse	FSC	ST	NONE	H	N	N
American white pelican		SE	B, D, E, F	M	M	M
Harlequin duck	FSC		B, D, E, F	P	M	M
Common loon		SS	B, D, E, F	M	M	M
Marbled murrelet	FT	ST	NONE	N	N	N
Black tern	FSC	SM	B, D, E, F	M	M	M
Caspian tern		SM	B, D, E, F	M	M	M
Forster's tern		SM	B, D, E, F	M	M	M
Great blue heron		SM	B, D, E, F	B	M	M
Black-crowned night heron		SM	B, D, E, F	B	M	M
Mammals						
Gray wolf	FE	SE	NONE	N	N	N
Canada lynx	FT	ST	NONE	N	N	N
Grizzly bear	FT	SE	NONE	N	N	N
California bighorn sheep	FSC		B, D, E, F	P	L	L
Pacific fisher	FSC	SE	NONE	N	N	N
Wolverine	FSC	SC	NONE	N	N	N
Western gray squirrel	FSC	ST	NONE	N	N	N
Washington ground squirrel	FC	SC	D, E, F	H	H	M-N
Pygmy rabbit	FSC	SE	D, E, F	H	H	M-N
Ord's kangaroo rat		SM	B, D, E, F	P	M	L
Northern grasshopper mouse		SM	ALL SEGMENTS	P	H	M
Sagebrush vole		SM	ALL SEGMENTS	P	H	M
White-tailed jackrabbit		SC	ALL SEGMENTS	B	H	M
Merriam's shrew		SC	ALL SEGMENTS	B	H	M
Potholes meadow vole	FSC		NONE	N	N	N
Pacific western big-eared bat	FSC	SC	ALL SEGMENTS	P	M	M

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Long-eared myotis	FSC	SM	ALL SEGMENTS	P	M	M
Long-legged myotis	FSC	SM	ALL SEGMENTS	P	M	M
Fringed myotis	FSC	SM	ALL SEGMENTS	P	M	M
Western small-footed myotis	FSC	SM	ALL SEGMENTS	P	M	M
Yuma myotis	FSC		ALL SEGMENTS	P	M	M
Pallid bat		SM	ALL SEGMENTS	P	M	M
Mardon skipper	FC	SE	NONE	N	N	N
Persius' duskywing		SM	E	P	Mn	Mn
Reptiles & Amphibians						
Cascades frog	FSC		NONE	N	N	N
Larch Mountain salamander	FSC	SS	NONE	N	N	N
Northern leopard frog	FSC	SE	D, E, F	P	Mn	Mn
Red-legged frog	FSC		NONE	N	N	N
Tailed frog	FSC	SM	NONE	N	N	N
Spotted Frog	FC	SE	ALL SEGMENTS	P	Mn	Mn
Woodhouse's Toad		SM	E, F	B	Mn	Mn
Sagebrush lizard	FSC		ALL SEGMENTS	B	H	M
Nightsnake		SM	B, D, E, F	P	H	M
Striped whipsnake		SC	ALL SEGMENTS	B	H	M

Federal Status
FE = Endangered
FT = Threatened
FC = Candidate
FSC = Species of Concern

State Status
SE = Endangered
ST = Threatened
SS = Sensitive
SC = Candidate
SM = Monitor

Presence
P = Present (general presence)
B = Breeding
M = Migrant
W = Winter Resident
N = Not Present
H = Historically Present, Not Currently Present

4.4.10 Recommended Mitigation

To reduce the impacts to wildlife associated with the construction, operation and maintenance of the proposed project, a number of mitigation measures would be implemented.

4.4.10.1 Big Game Disturbance

- Avoid construction on Segments A, E, and F during extreme winter weather or unusually heavy snow accumulations, when big game species are less mobile and more vulnerable to disturbance.
- Coordinate with WDFW to ensure that construction does not significantly interfere with big game wintering or migration.
- Gate and sign new or existing roads to prevent human encroachment into big game wintering areas or significant migration corridors.

4.4.10.2 Avian Collision Mitigation

Where possible, line up new structures with existing structures to minimize vertical separation between sets of transmission lines.

Install appropriate line markers in high risk areas, such as crossings of the Columbia River, Lower Crab Creek, the Cold Creek migration corridor, high ridge crossings such as the Saddle Mountains, Umtanum Ridge and Yakima Ridge and on Hanford Reach National Monument lands.

Monitor potential problem areas after construction to ensure that line markers are functioning properly.

4.4.10.3 Raptor Disturbance Mitigation

Time project construction to avoid critical nesting periods in known raptor nest locations, as determined by USFWS and WDFW.

Time project construction to avoid disturbing wintering bald eagles. Perennial stream and river crossings and the areas 1 mile on either side of these crossings should be avoided from early November through mid-March. Known eagle wintering locations include Wilson and Naneum Creeks, all Columbia River crossings and perennial creeks in the YTC.

4.4.10.4 Shrub-Steppe Habitat Loss Mitigation

To minimize the impacts to shrub-steppe, a Priority Habitat, minimize the construction area to the extent possible at structure sites and roads.

Install construction "envelopes": silt fencing or other barrier materials surrounding the construction site to prevent vehicle turnaround, materials storage, or other disturbance outside the designated construction area.

Do not clear vegetation for temporary vehicle travel or equipment storage outside of designated construction areas; crushing is preferable to removal.

When possible, avoid the use of access roads in steep terrain during unusually wet or muddy conditions or extremely dry conditions.

Prevent the spread of noxious weeds by revegetating disturbed areas using native seed mix at appropriate planting times as indicated by USFWS and WDFW and selectively applying herbicide as needed.

Carry fire fighting equipment in all vehicles and observe seasonal fire restrictions on construction. Park vehicles in areas free from dry grass or other vegetation.

4.4.10.5 Wildlife Disturbance Mitigation

Prior to initiating construction activities, conduct field surveys to identify areas of listed, candidate, or federal species of concern wildlife populations or colonies such as burrowing owls, sage grouse leks, and ground squirrels.

If possible, avoid locating structures, roads, construction staging areas, substations, or other disturbances in known colonies of small animal species.

Gate and sign new or existing roads to prevent human encroachment into areas containing significant wildlife populations or relatively undisturbed wildlife habitat.

Construction and operation and maintenance activities should be timed to avoid entry into sensitive wildlife habitats during critical breeding or nesting periods (as determined by USFWS and WDFW).

Vegetation removal would be limited to only the amount required to safely construct new access roads. Riparian vegetation would be removed only where absolutely necessary.

4.4.11 Cumulative Impacts

The proposed project could potentially impact the existing environmental conditions of current concern in eastern Washington, especially from the loss/fragmentation of native shrub-steppe plant and dependant wildlife communities.

The shrub-steppe habitat type has been significantly reduced from historic levels in Washington, and much of the remaining habitat is heavily disturbed by grazing, fire, or other land uses. It is generally recognized that preserving large, unbroken tracts of high quality shrub-steppe vegetation is important for maintaining populations of shrub-steppe dependant species such as sage grouse, sage sparrow, Washington ground squirrel and others (Johnson and O'Neil, 2001). WDFW has declared the shrub-steppe habitat type as a Priority Habitat.

Construction of structures and access roads through shrub-steppe vegetation would increase the existing levels of habitat fragmentation and reduce the amount of shrub-steppe vegetation available for wildlife habitat. Over time, native shrub-steppe vegetation may recolonize the disturbed areas. However, construction of the proposed project would increase the potential for the linear spread of noxious weeds into previously undisturbed areas. The presence of noxious weeds makes the recolonization of disturbed areas with

native vegetation extremely difficult, and generally leads to a long-term reduction in quality wildlife habitat.

4.5 Fish Resources

4.5.1 Impact Levels

High impacts to fish would occur when an action creates a significant adverse change in fish habitat, populations or individuals. High impacts might result from actions that:

- cause the ***take*** of a federally listed or proposed threatened, endangered fish species.
- cause a significant long-term (more than two years) adverse effect on the populations, habitat and/or viability of a federal or state listed fish species of concern or sensitive species, which would result in trends towards endangerment and/or the need for federal listing.
- ***harm*** or kill a significant number of individuals of a common fish species at the local (stream reach or small watershed) level.

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Moderate impacts to fish would occur when an action creates a moderate adverse change in fish habitat, populations or individuals. Moderate impacts might result from actions that:

- without causing a take, cause a temporary (less than two months) reduction in the quantity or quality of localized (stream reach or small watershed) aquatic resources or habitats at a time when federally listed threatened, endangered, or proposed fish species are **not likely** to be present (i.e., during non-spawning or rearing times).
- cause a short-term (up to two years) localized (stream reach or small watershed) reduction in population, habitat and/or viability of a federal or state listed fish species of concern or sensitive species, without causing a trend towards endangerment and the need for federal listing.
- harm or kill a small number of individuals of a common fish species at the local (stream reach or small watershed) level.

Low impacts to fish would occur when an action creates a minor or temporary adverse change in habitat, populations, or individuals. Low impacts might result from actions that:

- cause a temporary (less than two months) localized (stream reach or small watershed) reduction in the quantity or quality of aquatic resources or habitats of state listed fish species of concern or sensitive species, without causing a trend towards endangerment and the need for federal listing.

- cause a short-term (up to two years) disturbance or displacement of common fish species at the local (stream reach or small watershed) level.

No impacts to fish would occur when an action has no effect or fewer impacts than the low impact level on fish habitat, populations or individuals.

4.5.2 Impacts Common to Construction Alternatives

The construction, operation and maintenance of the proposed transmission line will impact fish populations that reside in or near the study area. The extent of impact would depend on the fish species, its distribution, its habitat requirements, and the availability of suitable habitat in and around the construction and study area (See Table 4.5-1, *Water Crossings and Fish Presence*).

Table 4.5-1
Water Crossings and Fish Presence

Line Segment	Preferred (2)	Alternative 1	Alternative 3	Alternative 1A
Intermittent Drainages[1]	44	41	68	38
Canals and Drains[2]	9	4	0	1
Lakes	1	2	1	2
Perennial Streams	11	11	20	11
Fish Bearing Streams[3]	10	11	17	11

1 Intermittent drainages were determined from USGS 7.5 minute quad maps. These drainages may be seasonally intermittent or only contain water during storm events. It is assumed that these drainages do not contain fish.

2 Canals and drains were determined from USGS 7.5 minute quad maps. Although fish may be periodically observed, it is assumed that canals and drains do not contain fish.

3 Perennial streams that are known to contain fish. Where the ROW crosses the intermittent headwaters of a perennial stream that is known to contain fish, it is assumed that fish are present and could be affected by the project.

4.5.2.1 Construction Impacts

Short-term construction disturbances, depending on the time of year and the location, could impact various fish species by causing sedimentation, habitat and/or individual fish disturbance, or the release of hazardous materials into a waterway. The following would be potential short-term impacts:

- Damage to fish or fish habitat from construction sediments entering streams.
- Soil from roads, cleared areas, excavations, stockpiles or other construction sources might enter streams and cause an increase in ***sediment load*** and/or ***sediment deposition*** in spawning gravels.

- Concrete washing or dumping might allow concrete waste to enter streams and cause an increase in sediment load.
- Other construction materials (metal parts, insulators, wire ends, bolts, etc.) might enter streams and cause changes in flow or other unknown effects.
- Mechanical disturbance of fish habitat from equipment operating in, crossing, or passing streams.
- Streambank compaction or sloughing might reduce the streambank's ability to support vegetation, or cause sediment input or increased runoff.
- Heavy equipment moving across a stream (or repeated travel by light equipment) might cause substrate disturbance, including sediment release or substrate compaction.
- Riparian vegetation destruction or removal (this would be incidental only; planned vegetation removal for new ROW and roads is a long-term impact) may cause a loss of fish habitat (cover), loss of stream shading, removal of large woody debris sources, and reduction in ***buffer*** capacity.
- Disturbance of individual fish from equipment operating in or near streams.
- Vibration or shock from equipment operating in or near streams would drive fish to less suitable habitat or to areas where predation is more likely. In marginal conditions such as extreme low flows and high water temperatures, stress from repeated disturbance may cause death.
- Mechanical injury or death from equipment crossing or operating in streams, especially to fish that live in or on the bottom of the stream (such as sculpins).
- Injury or death of fish or their prey from hazardous materials spills.
- Petroleum fuel products, hydraulic oil, and other hazardous materials typically associated with construction activities may enter the stream, causing fish kills, aquatic invertebrate kills, and death or injury to a number of other species that fish depend on for food. Spills may also create pollution "barriers" to fish migration between stream reaches.

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Depending on the location and the fish species present, short-term impacts would range from low to high. Short-term disturbances such as those listed above would constitute a high or medium impact on most species. However, since most of the project construction will occur away from streams and include mitigation (such as construction timing restrictions and spill prevention and erosion measures), short-

term construction-related disturbances should result in low or no impacts to all fish species.

4.5.2.2 Operation and Maintenance Impacts

Long-term impacts resulting from ongoing operation and maintenance would result mostly from habitat alteration due to clearing of riparian vegetation, changes in runoff and infiltration patterns (from upland vegetation clearing), sedimentation from cleared areas, and maintenance access across streams.

Since the new transmission line would span narrow riparian areas or be located upslope of stream channels, little or no riparian vegetation would be removed. Where access roads are required to cross streams, riparian vegetation may be removed. Since riparian areas are extremely important in providing stream shading and cover for fish, and are a source of large woody debris in streams, any clearing of stream-side riparian vegetation would likely cause moderate to high impacts to fish species, should they be present.

The area cleared for structure construction and access roads in upland areas could change runoff and infiltration patterns to the extent that flow regimes in creeks would be altered, especially in smaller drainages. A decrease in groundcover from vegetation removal can cause an increase in sheet flow during storm events, with correspondingly less infiltration. This can cause higher flood flows in creeks and reduce the amount of infiltrated water that can support base flows. Higher flood flows cause more erosion and deposition of fine materials, which may affect fish habitats or cause physical damage to fish through gill abrasion. Lower base flows, in areas where base flows are already low, may cause streams to dry up in some places or result in warmer water temperatures, which can cause harm or be lethal to fish.

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Clearing for roads and structure sites increases the risk of sediment input due to the erosion of soil that is normally stabilized by vegetative cover. Sedimentation of streams can cause a degradation of spawning areas, by filling the ***interstitial spaces*** in spawning gravels. This reduces the flow of oxygenated water necessary for egg and ***alevin*** survival.

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Creating new vehicle access across streams can cause bank compaction, repeated sediment disturbance, disturbance or physical damage to fish (if present), a conduit for sediment input, and the possible release of automotive wastes such as fuel or hydraulic oil into a stream. Stream crossings of intermittent drainages would be accomplished by constructing fords where possible. Ford construction would involve removing a portion of the streambed

below grade, then backfilling it with crushed rock or other suitable rocky material to the original streambed level. Ford approaches would be stabilized with crushed rock to reduce erosion and provide an all weather surface. Drainages that are too incised or steep to ford may be fitted with culverts or bridges to provide water and debris passage.

Perennial streams would be crossed using existing crossings, where possible. In areas where adequate crossings or alternative routes do not currently exist, bridges or culverts would be used to maintain fish passage and stream flows, while providing vehicle access. Approaches to crossings would be stabilized with crushed rock to reduce erosion and provide an all weather surface. Access roads would experience intense use during construction, but use should not increase much over current threshold levels once construction is complete.

Operation of the proposed project would be limited to energizing the conductors. Normal operation of the project would have no impact on fish species (see Appendix F Addendum for more information).

Maintenance of the project might include periodic vehicle and foot inspections, helicopter surveys, tower and line repair, ROW clearing, and other disturbances. Depending on the time of year and location, maintenance activities could impact fish species or habitat. Periodic ROW clearing will be mostly limited to riparian areas, where the impact might be high. Maintenance impacts will be similar to those impacts related to short-term construction (Section 4.5.2.1, *Construction Impacts*).

4.5.3 Preferred Alternative (Alternative 2)

The Preferred Alternative would include Segment A, Segment B (Option $B_{SOUTH)}$ and Segment D.

4.5.3.1 Segment A

Segment A would cross 28 intermittent drainages and eight perennial streams, seven of which are known to be fish bearing. Wilson Creek, Naneum Creek, Schnebly Creek, Coleman Creek, Cooke Canyon Creek, Caribou Creek, and Parke Creek are all known to contain fish. Cave Canyon Creek does not contain fish.

Both Wilson Creek and Naneum Creek are in steep canyons. Structures would be placed high up and well away from both streams. Access would be through existing county and access roads. Since no new construction would occur near the streams, no impacts to fish

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are expected. The increase in traffic along the existing roads would be insignificant.

Schnebly Creek and Coleman Creek both have existing access from county and access roads, and the structures would be constructed high up and away from the creek edges. No impacts to fish are expected.

Cooke Canyon Creek, near the proposed crossing, has several channels and lies in a wide floodplain that is mostly pasture. One or more structures might need to be located in the pasture/floodplain, and access to these structures using a bridge or culvert might be needed across one channel of the creek. Removal of riparian vegetation would most likely be required for the access and possibly for overhead clearance. This would create a moderate impact to rainbow trout, cutthroat trout, and brook trout. With mitigation (see Section 4.5.10, *Recommended Mitigation*), this impact could be reduced to low.

Caribou Creek and Parke Creek both have access from either side of the creek, eliminating the need for new crossings. Structures would be located well away from the creek. No impacts to fish are expected.

The proposed reroute of part of Segment A would move the crossing of Cooke Canyon Creek south by approximately 0.3 mile to an area with much less riparian vegetation and multiple channels. Less riparian vegetation would have to be removed in this area; therefore impacts to fish would be less than the original alignment.

4.5.3.2 Segment B (Option B_{SOUTH})

The Preferred Alternative would only use Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used. Segment B (Option B_{SOUTH}) would cross five intermittent drainages, two fish-bearing perennial streams (Middle Canyon Creek and Johnson Creek), and the Columbia River, which is also fish bearing.

Middle Canyon Creek and Johnson Creek would both be crossed in their headwaters, where conditions are generally unsuitable for fish survival during most times of the year. Therefore, there would be no direct impacts to fish (injury, disturbance from equipment, etc.). However, since both creeks would need to be crossed with a ford, the streambed would be disturbed during creation of the ford, which would have the potential to cause increased sediment input, bank destabilization, and riparian vegetation removal. Also, hazardous materials spills from equipment traveling across the fords could move downstream to where fish are present, should the stream be flowing.

Thus, indirect impacts to fish could be high depending on the nature and quantity of the spill and the time of year it occurs. With mitigation such as construction during ***in-water work windows*****,** spill control and erosion controls (see Section 4.5.10, *Recommended Mitigation*), impacts to fish in these streams should be low.

The Columbia River would be crossed by a long span, with structures set well away from the banks. Since the structures and access roads would be far away from the edge of the river, sediment or other materials would not be able to reach the water. Therefore, there would be no impacts to any fish species in the Columbia River along Segment B.

4.5.3.3 Segment D

Segment D crosses 11 intermittent drainages, nine canals or drains, one perennial stream, and the Columbia River. Lower Crab Creek, and the Columbia River both contain fish.

The Lower Crab Creek crossing would have structures placed over 200 feet from the stream bank. Access would be from either side, so no new crossings of Lower Crab Creek are proposed. Since no new construction will occur near Lower Crab Creek, impacts to fish (Chinook salmon, steelhead, rainbow trout, brown trout and warm water fish) are expected to be low.

The proposed crossing of the Columbia River would parallel the existing transmission lines. The structures would be set over 200 feet from the edge of the river, and access would be from existing roads on either side of the river. Since no new access roads near the river would be built and there is sufficient distance from the structures to the river, no sediments spills or other materials would be able to easily enter the river. Impacts are expected to be low.

4.5.4 Alternative 1

Alternative 1 would include Segment A, Segment B (Option $B_{NORTH)}$ and Segment E.

Impacts to fish resources along Segment A would be the same as described for the Preferred Alternative (see Section 4.5.3.1, *Segment A*).

4.5.4.1 Segment B (Option B_{NORTH})

Alternative 1 would only use Option B_{NORTH} of Segment B. Option B_{SOUTH} would not be used. Segment B (Option B_{NORTH}) would cross five intermittent drainages, two fish-bearing perennial streams (Middle Canyon Creek and Johnson Creek), and the Columbia River,

which is also fish bearing. Impacts to fish species would be the same as those discussed in Alternative 1 (see Section 4.5.3.2, *Segment B (Option B_{SOUTH})*)

4.5.4.2 Segment E

Segment E crosses eight intermittent streams, four canals or drains, two lakes, one perennial stream, and the Columbia River. Both lakes, the stream, and the Columbia River contain fish. Segment E would parallel Segment D from the Vantage Substation to the top of the Saddle Mountains, then head southeast into the Hanford Site.

No Wake Lake is a private constructed lake used for water skiing. It contains warm water species of fish. Structures may be placed close to the water, but access would be from either side. The land surrounding the lake is relatively flat, which would limit the erosion potential from structure and access road construction, and limit the potential for spills to enter the lake. No impacts to fish are expected at this location.

Since Segment E would cross Lower Crab Creek near the locations where Segment D would cross, impacts would be similar for this area to those described for Segment D. Towers would be placed over 200 feet from the banks and no access road crossing would be installed.

Saddle Mountain Lake would be crossed at its eastern end, near where the overflow channel (Saddle Mountain Wasteway) exits. An existing access road crosses the wasteway and could be used for access. Structures would be placed over 200 feet from either side of the edge of the lake. Riparian vegetation is relatively low, although some trees may need to be removed for overhead access. The lake supports warm water fish only. Since no new access roads would be built, structures would be located away from the lake. No sensitive fish species are present, so impacts would be low.

The Columbia River crossing into the Hanford Site would be accessed from either side of the river. Structures would be placed well back from the edge of the river. There is very little riparian vegetation in this area and none of it would need to be cleared. Impacts to fish species in the Columbia River at this location would be low.

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4.5.5 Alternative 3

Alternative 3 would include Segment A and Segment C.

Impacts to fish resources along Segment A would be the same as described for the Preferred Alternative (see Section 4.5.3.1, *Segment A*).

4.5.5.1 Segment C

Segment C construction would cross 40 intermittent drainages and six perennial steams, five of which are fish bearing. Middle Canyon Creek, Johnson Creek, Hanson Creek, Alkali Canyon Creek, and Corral Canyon are all known to contain fish. No fish are present in Cold Creek.

Middle Canyon Creek and Johnson Creek would be crossed with fords in their headwater sections. Impacts to fish in these two creeks would be similar to those described for Segment B.

Hanson Creek and Alkali Canyon Creek both contain rainbow trout and brook trout throughout their lower and middle reaches. Both of these creeks and Corral Canyon Creek support Chinook salmon in their very lowest reaches near the Columbia River. These creeks are in steep canyons, so the structures would be placed on either side of the canyons well above the creek. No impacts are expected from structure construction and placement. However, all three of these streams would need to have bridges or culverts placed in them to allow vehicular access. Impacts to fish, especially Chinook salmon, from construction of these access roads and structures could be high, depending on when the construction occurs, if sediments or spills enter the creek, and if fish are present. With mitigation such as in-water work during work windows, erosion and spill control measures, and construction of structures that allow fish passage (see Section 4.5.10, *Recommended Mitigation*), impacts to rainbow trout, brook trout, and Chinook salmon would be low.

4.5.6 Alternative 1A

Impacts t Segments

Alternative 1A would include Segment A, Segment B (Option B_{NORTH}) and Segment F.

Impacts to fish resources along Segment A would be the same as described for the Preferred Alternative (see Section 4.5.3.1, *Segment A*). Impacts to fish resources along Segment B (Option B_{NORTH}) would be the same as described for Alternative 1 (see Section 4.5.4.1, *Segment B (Option B_{NORTH})*).

4.5.6.1 Segment F

Segment F would cross 30 intermittent drainages, one canal, one lake, one perennial stream, and the Columbia River. Nunnally Lake, Lower Crab Creek, and the Columbia River all contain fish.

Nunnally Lake is a closed depression north of Lower Crab Creek that has been filled with water and contains rainbow trout and various warmwater fish species. It is managed as a recreational fishery.

Access roads would be routed around the lake, and structures would be located on either side, over 200 feet from the edge of the lake. Since no new access roads would be constructed near the lake, structures would be placed far away from the edge. No riparian vegetation would be removed, so the impact to fish in Nunnally Lake would be low.

Segment F would cross Lower Crab Creek approximately one mile upstream of where Segment D and E cross. No access road would be construction across the creek and the towers would be placed over 200 feet away from the stream. Impacts to fish are expected to be low.

Segment F would use the same crossing of the Columbia River as described in Segment E, so impacts to fish would be similar to those described in that section.

4.5.7 No Action Alternative

The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance and potential sedimentation of streams due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. In addition, vehicle and machinery use, and vegetation management practices could contribute minor amounts of pollutants (e.g., fuel, oil, grease, rubber particulate, woody debris) that could be transported to streams. No new impacts to fish resources are expected under the No Action Alternative.

4.5.8 Threatened and Endangered Species

Table 4.5-2, *Impacts to Fish Species*, contains listed fish species present within the study area. A discussion of the impacts to federally listed threatened, endangered, or candidate species follows. A Biological Assessment is being prepared separately, which will present effects determinations for each of these species.

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4.5.8.1 Chinook Salmon (Upper Columbia River Spring Run ESU)

Upper Columbia River Chinook salmon (a federally listed endangered species) are present in the study area only in the Columbia River, where the Preferred Alternative and Alternatives 1, 3, and 1A (specifically, Segments B_{NORTH}, B_{SOUTH}, D, E, and F) cross it. The construction and operation of all alternatives (specifically, Segment A, and C) would have no impact on Upper Columbia River Chinook

salmon, since they are not present in the Yakima River basin and the streams that these segments cross.

Construction of any of the three Columbia River crossings associated with the Preferred Alternative and Alternatives 1, 3, and 1A would also have no impact on Upper Columbia River Chinook salmon. This is because structures would be built far enough away from the river bank and riparian areas to eliminate the potential for sediments, spills or other materials to enter the river. New structures at river crossings would parallel existing structures, which range from 200 to 1,000 feet from the edge of the river. Access to the structures would be limited to the landside of the structures and would not enter the riparian zone. Riparian vegetation removal would not be required at any of the Columbia River crossings.

4.5.8.2 Steelhead Trout (Upper and Middle Columbia River ESUs)

Middle Columbia River ESU steelhead (a federally listed threatened species) are present in the Yakima River basin, but are not known to exist in the streams along Segment A. However, these streams are federal designated critical habitat. Upper Columbia River ESU steelhead (a federally listed endangered species) are present in the lower reaches of two streams crossed by Segments B_{NORTH}, B_{SOUTH}, C, D, E, and F. They also exist in the Columbia River where Segments B_{NORTH}, B_{SOUTH}, D, E, and F cross it.

The streams along Segment A in the Yakima River basin might have minor impacts to water quality, should construction cause sediments or other materials to enter these stream, causing a moderate impact to Middle Columbia River steelhead. However, with mitigation (see Section 4.5.10, *Recommended Mitigation*), no impacts to Middle Columbia River Steelhead would be expected. The Columbia River crossings (described in the Chinook Salmon section above) would have no impact on Upper Columbia River steelhead. Crossings of Johnson Creek on Segments B_{NORTH}, B_{SOUTH}, C, and G would not directly impact Upper Columbia River steelhead, since this creek does not support steelhead where these proposed segments cross it. However, the lower reach of Johnson Creek does support steelhead, and indirect impacts could occur from sediments, spills, or other materials entering the creek, or removal of upland and riparian vegetation that might change flow regimes and increase stream temperatures. The area of Lower Crab Creek where Segments D, E, and F cross it may support steelhead; however, the construction of structures and access roads would not occur within 200 feet of Lower Crab Creek, and no riparian vegetation would be removed. Thus, with mitigation (see Section 4.5.10, *Recommended Mitigation*), no impacts to Upper Columbia River steelhead would be expected.

4.5.8.3 Bull Trout Columbia River DPS

Bull trout (a federally listed threatened species) are not known to currently exist within any of the streams, lakes or rivers crossed by the project, although all streams and rivers are designated as critical habitat. Coleman Creek, near Ellensburg, is known to have historically contained bull trout, but none have been observed since 1970 and it is unknown whether any are still present. No historical records of bull trout are documented in any of the other proposed stream crossings. No new access roads would be constructed across Coleman Creek and the structures would be placed well away from the creek. Since construction would occur far from the creek, and no sediments, spills, or other materials would be likely to enter the creek, the project would have no impact on bull trout. (See Table 4.5-2, *Impacts to Fish Species*.)

Table 4.5-2
Impacts to Fish Species

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Chinook Salmon (Upper Columbia River Spring Run ESU)	FE	SC	B_{NORTH}, B_{SOUTH}, D, E, F	P	High	Low
Steelhead Trout (Middle Columbia River ESU)`	FT	SC	A	P	No Impact	No Impact
Steelhead Trout (Upper Columbia River ESU)	FE	SC	B_{NORTH}, B_{SOUTH}, C, D, E, F	P	High	Low
Bull Trout	FT	SC	A	H	No Impact	No Impact
FE = Endangered FT = Threatened		SC = Candidate		P = Present (general presence) H = Historically Present, Not Currently Present		

4.5.9 Special Status Species

Table 4.5-3, *Impacts to Special Status Fish Species*, lists state and federal special status species that may be present within each segment of the study area and indicates the possible impact the project may have on them.

Table 4.5-3
Impacts to Special Status Fish Species

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Coastal Cutthroat Trout	FP		NONE	N	N	N
Westslope Cutthroat Trout	FSC		A	P	M	L
Interior Redband Trout (Rainbow)	FSC		ALL SEGMENTS	P	H	L
Margined Sculpin	FSC		NONE	N	N	N
Pacific Lamprey	FSC		B_{NORTH}, B_{SOUTH}, D, E, F	P	L	N
River Lamprey	FSC		A	P	L	N

Federal Status	State Status	Presence
FE = Endangered	SE = Endangered	P = Present (general presence)
FT = Threatened	ST = Threatened	B = Breeding
FC = Candidate	SS = Sensitive	M = Migrant
FSC = Species of Concern	SC = Candidate	W = Winter Resident
	SM = Monitor	N = Not Present
		H = Historically Present, Not Currently Present

4.5.10 Recommended Mitigation

The following mitigation measures would be implemented in order to reduce or eliminate impacts to fish species from the construction, operation, and maintenance of the proposed project.

To minimize short- and long-term impacts to fish from structure construction:

- To reduce the possibility of sediments or spills entering streams or lakes, structures would be placed over 200 feet (where possible) from the edge of streams or lakes that are known to contain fish.
- Sediment and stormwater controls including silt fence, waterbars, and dust control would be implemented, if necessary, on construction sites located near fish bearing water bodies.

- To prevent spills of fuel or hazardous materials from entering streams and/or groundwater, a spill prevention and spill response plan would be developed and implemented prior to construction. Spill kits would be carried in all equipment and vehicles.
- To prevent erosion and sediment movement, vegetation removal would be limited to the amount required for safe working conditions and tower placement. Where possible, vegetation (even if temporarily disturbed but not destroyed) would be left in place.
- To reduce the amount of exposed soils that could be eroded, site restoration would occur following construction. Disturbed areas would be planted with native vegetation suitable for the local area. Vegetation would be planted only during appropriate local planting seasons as indicated by USFWS and WDFW.

To minimize short- and long-term impacts to fish from access road construction and use during maintenance activities:

- To protect certain life-stages of fish species, in-water work would only occur during WDFW in-water work windows, or as otherwise authorized or directed by WDFW. Work near sensitive spawning areas, such as those found near the Columbia River crossings would occur only when spawning fish are not present.
- To prevent damage to stream banks and reduce the potential for sediment or hazardous material input to streams, access roads would be placed as far away from creeks as terrain and ROW will allow.
- Where fish-bearing streams must be crossed, existing access roads would be used where available. New crossings would be constructed using culverts or bridges that allow for uninterrupted fish passage. Fords would be limited to intermittent non-fish-bearing streams and the intermittent headwaters of fish-bearing streams.
- Approaches to stream crossings would be rocked with crushed gravel or other material suitable to prevent erosion and minimize road damage from vehicles and equipment during wet conditions.
- Temporary sediment controls such as silt fence would be installed prior to construction, and monitored for proper function until completion of construction and site restoration. Permanent stormwater and sediment controls like ditches and

waterbars would be installed on slopes and maintained periodically.

- Vegetation removal would be limited to only the amount required to safely construct new access roads. Riparian vegetation would be removed only where absolutely necessary.
- Cutbanks, fill banks, and other areas of disturbed soils other than the traveled way would be reseeded as soon as possible after completion of construction.
- Access control structures such as gates, large waterbars and eco blocks would be placed at access road entrances, to limit the amount of vehicular traffic that might create erosion problems or other disturbance to streams containing fish.

4.5.11 Cumulative Impacts

The proposed action may contribute to localized, short-term, and long-term disturbance to fish resources, as a result of increased sediment input and possible hazardous materials spills. Erosion and sedimentation of streams within the study area has increased over the past 100 years due to land use practices such as grazing, agriculture, road building, land clearing, military operations, and other disturbances. This has contributed to a reduction in the quality and availability of fish habitat in many streams. Increased access and human activity around streams during this time period has also increased the frequency of hazardous material spills entering streams. While spill events are relatively rare and generally confined to a single stream or stream reach, their effects can be devastating to fish resources.

Riparian vegetation has been significantly reduced from historic levels in Washington, and much of the remaining habitat is heavily disturbed by grazing, fire, and other land uses. Some riparian habitat would be lost as a result of the proposed project, adding cumulatively to the degradation of fish habitat.

4.6 Land Use

4.6.1 Impact Levels

Impacts would be considered **high** where an action would:

- convert prime farmlands (as defined in the Farmland Protection Policy Act (FPPA) (7 U.S.C. 4201 et seq.) to a non-farm land use.
- convert other active and productive farmlands to a non-farm land uses.
- create areas of non-inhabitable land where residential uses already exist or are permitted.
- prevent the use of the land according to existing or approved land management plans.

Impacts would be considered **moderate** where an action would:

- adversely affect existing prime or other farmlands by limiting farm production or the types of farm uses.
- adversely affect residential, commercial, or industrial properties by eliminating or limiting the potential for residential development to occur around or underneath the transmission lines and/or structures.
- adversely affect commercial or industrial properties by introducing additional or new inconveniences to business operations.
- alter the use of the land according to existing or approved land management plans.

Impacts would be considered **low** where an action would:

- create short-term disturbances such as minor crop damage during construction or restrict improvements to previously affected areas (e.g., existing structure locations).
- create short-term disturbances, but still allow the continued use of the land according to existing or approved land management plans.

No impact would occur when land uses would be able to continue as currently exists.

4.6.2 Impacts Common To Construction Alternatives

Heavy machinery used for construction would temporarily damage crops, compact soils, and disrupt land use activities on approximately 0.3 acre around each structure. Since this disturbance would be temporary and pre-construction conditions would be re-established, the impact level to land uses from construction would be low.

To construct and maintain the proposed transmission line, some existing access roads would need to be improved and new access roads would need to be constructed. The road improvements would occur across lands that support a number of different land uses. Improvements to existing roads would not impact existing land uses. New roads would have a low impact because those within agricultural fields would be temporary, others would be constructed around agricultural fields and residential uses, landowners would be able to use the roads across rangeland and the movement of livestock would not be hindered, and they would not disrupt activities on public land such as the Yakima Training Center and the Saddle Mountains Unit of the Hanford Reach National Monument.

Table 4.6-1, *Structure and Access Road Impacts to Existing Land Uses*, provides estimated number of acres that would be used in association with the placement of structures and construction or improvement of access roads by land uses for each alternative. In addition to these impact quantities, there would be some impacts to land uses associated with the presence of overhead conductors.

Table 4.6-1
Structure and Access Road Impacts to Existing Land Uses

	Structure and Access Road Impacts (est. acres)			
Existing Land Use	**Preferred (2)**	**Alternative 1**	**Alternative 3**	**Alternative 1A**
Commercial, Industrial, or Transportation	3.81	2.1	2.3	2.7
Residential	0.3	0.2	0.3	0
Forest	5.7	5.5	7.8	5.1
Range	360.7	446.3	632.0	531.6
Agricultural	35.6	55.2	3.9	6.8
Total	**406.1**	**509.3**	**646.3**	**546.2**

The area that would become new ROW would have limitations on the types of crops that may be located under the transmission lines. Non-structure supported agricultural crops must be kept at a height of less than 10 feet. As a result, the impact to agricultural lands with these types of crops would be moderate. A special agreement between BPA and the landowner may be reached that allows the

growing of ornamental or orchard trees as well as structure supported crops under the transmission lines. If this agreement were in place the impact level would become low.

Rangeland is the highest percentage land use for all alternatives. However, the existing use of these lands for such things as grazing would be able to continue around the structures, underneath the transmission lines, and over any necessary access roads. Therefore, even though rangeland is the land use with the greatest amount of acres crossed per alternative, the impact level to rangeland would be low.

U.S. Bureau of Reclamation (BOR) administered lands are crossed by all alternatives. The BOR manages water resources and maintains and develops water distribution systems, such as irrigation canals, that move water to farmlands. Impacts to BOR land would be low as long as the structures were located in areas that did not disrupt the existing irrigation distribution system or in locations that would hinder the development of future systems.

All construction alternatives begin at the existing Schultz Substation. There would be no impact from the addition of this new bay and equipment since no new land outside the existing substation boundary is needed.

4.6.2.1 Aircraft Safety

The Federal Aviation Administration (FAA) is responsible for oversight of air safety in the United States and issue regulations (FAR) regarding marking and lighting of potential obstructions to air navigation. The regulations call for marking and/or lighting any temporary or permanent object that is taller than 200 feet (61 m) above ground level or that exceeds the obstruction standard contained in FAR Part 77, Subpart C. Certain obstructions may not require marking and/or lighting if a FAA aeronautical study indicates they do not impair aviation safety.

FAA regulations also require notification of construction or alteration in buffer zones around airports, including military airports. An airport with runways less than 3,200 feet requires a buffer of 10,000 feet; for runways greater than 3,200 feet, a 20,000-foot buffer is required. Within these buffers the FAA has set standards for the height of objects and notification to the FAA of construction or alteration is required.

Options to meet the FAA safety standards are routing the transmission line outside the buffer zone, using low-profile towers, placing the line

underground in the affected area, or marking and/or lighting the towers and/or conductors.

General BPA policy is to follow FAA recommendations with respect to airway marking and lighting near all airports.

Overhead transmission lines represent a hazard to low-flying aircraft such as those used in the military training exercises conducted at the YTC. Segments A and B would parallel existing transmission lines as they cross the YTC. Segment C would cross the YTC in areas where no transmission lines currently exist.

On the YTC overhead transmission towers and conductors would pose a hazard and affect the ability to operate the low flying aircraft (helicopters, F-18s, and A-10s). These aircraft are used for training and ground support during training exercises conducted on the YTC. The towers and conductors would also affect the parachute drops used to bring in supplies during maneuvers.

To reduce the profile of the proposed line where it crosses the YTC, the proposed towers and conductors in the YTC will be at a lower height above ground than elsewhere along the route. This is accomplished by orienting the conductor bundles in a flat configuration at the same height above the ground. Two overhead ground wires are located above the conductor bundles. This design results in a lower profile for the transmission line than does the standard delta (triangular) configuration with overhead ground wires used elsewhere.

In the YTC standard airway marker balls would be installed on the overhead ground wires to enhance visibility of the conductors. At present the technology for lighted marker balls is not reliable.

4.6.3 Preferred Alternative (Alternative 2)

4.6.3.1 Segment A

Reminder

In Segment A, the new and existi transmission lines would have a separation of up to 1,400 feet.

A small portion of Segment A, roughly 0.53 mile (2 percent), would cross agricultural lands. The agricultural land along this segment is predominantly dryland farming with hay or wheat as the prime crop. It is estimated that just over 3.9 acres of agricultural land would be impacted by this segment. Even though the total quantity of agricultural land being affect is relatively limited, the impact to this land would be high due to the land being converted from its agricultural use. No prime farmland would be impacted since the

transmission facility would most likely be able to span the designated soils.

Along the north side of the existing transmission line there is an area of lots that contain log cabin residences that would be crossed by the proposed segment. The impact to these residential uses and properties would be high. Locating the segment across the planned subdivision area would impact approximately 11 acres and would alter the development by reducing the number of residential units. The impact to residential land uses would be high.

A commercial quarry operation near the Vantage Highway would be crossed by Segment A. Structure locations may be designed to have a moderate impact on the quarry by placing them outside the area of use. Impacts to quarry operations would also be moderate as long as facility operations were able to continue within and across the transmission line right-of-way.

A small portion of Segment A, approximately 2.04 miles (7 percent) would traverse lands administered by the DNR. The land in the area of this segment is considered transition lands by DNR and is used as rangeland for livestock. As with all rangeland crossed by the various segments, the impact to this land use would be low since the use activities would be able to continue relatively uninterrupted.

An even smaller portion of Segment A, roughly 1.5 miles (5.2 percent), would traverse lands administered by the BLM. This land is also used as rangeland and, again, the impact to this land use is low since the use activities would be able to continue relatively uninterrupted.

The southern end of this segment crosses the northern border of the Yakima Training Center (YTC) and continues through the Middle Canyon Complex of the YTC for roughly 5.6 miles before it ends just inside the northern border of the Johnson Creek Complex. The U.S. military conducts armor and mechanized infantry movements, tanks and other vehicle movements, and force-on-force maneuver exercises in these two complexes. The existing Schultz-Vantage line that Segment A would parallel were in place prior to this land area becoming part of the YTC. As a result, the military has tailored the type of maneuvers that occur in these two complexes so that the presence of these transmission lines only slightly restricts the maneuverability of the military units. However, a new transmission line parallel to but 1,200 feet away from the existing lines would create additional long-term impacts to the military training mission and would have an impact on land use and land use planning on the installation. Therefore, the impact to the YTC in this area would be moderate.

The proposed Segment A reroute of approximately 1.3 miles would cross 1.2 miles of private land and 0.1 miles of BLM land. Impacts to these land uses would be the same as those impacts described along the original Segment A alignment.

4.6.3.2 Segment B

Option B_{SOUTH} – Option $B_{SOUTH}R$ would traverse roughly 8.13 miles (78.4 percent) of the Johnson Creek Complex of the YTC with the remaining portion traversing rangeland and open water.

The impact to rangeland would be low. There would be no impact to open water crossed because the transmission line would span water bodies.

The existing transmission lines that Segment B would parallel immediately adjacent to through the Johnson Creek Complex were in place prior to this land area becoming part of the YTC. The U.S. military has tailored its use of this area to accommodate these existing transmission line facilities. Since the new transmission line would be adjacent to an existing line, the impacts to the YTC along B_{SOUTH} would be low.

4.6.3.3 Segment D

Reminder

The first number in BPA structure numbers is the transmission line mile and the second number is th structure in that mile.

Segment D would parallel or replace the existing Midway-Vantage 230-kV line and parallel the Midway-Big Eddy 230-kV line from the Vantage Substation to the new Wautoma Substation (about 27.3 miles). The portion of the segment that would replace a single-circuit 230-kV line with a double-circuit 230/500-kV line would occur through an agricultural area located in Grant County, south of the Saddle Mountains ridge and north of the Columbia River. The double-circuit portion from structure 11/1 to 2/4, a total of 8.2 miles, would minimize the impact to the agricultural fields. The existing crops are expected to continue being grown underneath the transmission lines.

Roughly 0.85 mile of prime farmland would be crossed by this segment in Grant County. However, this prime farmland is in the area of the double-circuiting, where the new structures would be placed in the same location as the existing structures, minor impacts to this land would be expected.

The remaining agricultural lands crossed by Segment D are located in Benton County south of Umtanum Ridge and north of Cold Creek. Roughly 1.8 miles is designated as prime farmland. Through this area, which consists mainly of vineyards and orchards irrigated

through canals instead of circle irrigation, Segment D would parallel the existing Midway-Big Eddy line. It is estimated that six transmission structures would be located within the prime farmland areas for an estimated impact of 2.3 acres. Impacts to agricultural land (including the prime farmland) would be minimized by locating new structures on the edges of fields, vineyards, or existing roads. The impact to agricultural lands south of Umtanum Ridge would be high because of the loss of farm land.

The total miles of agricultural land crossed by Segment D would be approximately 8.85 miles. Double-circuiting and the placement of structures at the edge of fields or roads in the remaining agricultural areas would result in a moderate impact to agricultural uses.

The Preferred Alternative would terminate at the new Wautoma Substation. This facility would require converting approximately 25 acres of agricultural land from an agricultural use to a utility use. Removing 25 acres of agricultural land from production would be a high impact.

Residential uses along the double-circuit section would not be impacted. Residential uses would continue in their present location. North of the double-circuit section there are two residences along the west side within 200 feet of the existing transmission line. However, the impact to these residences would be low as long as the new structures were located to avoid the residences. The overall impact to residential land uses would be low.

Less than one mile of Segment D would cross through a section of the Columbia National Wildlife Refuge located on the north side of the Saddle Mountains and along the south side of Lower Crab Creek. Paralleling an existing transmission line through this area would result in a moderate impact due to some loss and degradation of wildlife habitat, increased fragmentation, and increased human disturbance to wildlife.

Segment D would cross approximately 2.87 miles of the western end of the Saddle Mountains Management Area. This land is located north of the agricultural areas in Grant County. BLM manages this land for multiple land uses, such as mineral resources, rangelands, recreation, and wildlife habitat. The area crossed by this segment is used predominantly as rangeland with some off-road vehicle recreation use. As with all rangeland crossed by the various segments, the impact to this land use would be low since the uses would be able to continue relatively uninterrupted. The impact to off-road vehicle use would also be low since vehicles would be able to move under and around the transmission line. One of the six management objectives of the Saddle Mountains Management Area

is to keep public lands open for purposes such as rights-of-way. The overall impact to land uses on BLM lands would be low.

Segment D would cross a small portion of DNR administered land, approximately 2.08 miles (7.6 percent). Roughly 1 mile of this land is used for agricultural purposes and would be in the area of the double-circuiting. The impact to this agricultural land would be low. The remaining portion of DNR land is predominantly rangeland. The overall impact to DNR lands would be low.

Reminder

The land use designation Preservation on the Hanford Reservation is intended to provide protection for sensitive areas or species of concern from impacts associated with intensive land-disturbing activities.

Segment D would also cross a small portion of the Saddle Mountains Unit of the Hanford Reach National Monument before crossing the Columbia River into Benton County and continuing south through the west side of the Hanford Site. Like Segment E, the area crossed has a land designation of Preservation. The policies of the Final Hanford Comprehensive Land Use Plan EIS state that existing utility corridor rights-of-way are the preferred routes for expanded capacity. Still, since Segment D would expand an existing ROW by 150 feet to accommodate the new line, some loss and degradation of wildlife habitat, increased fragmentation, and increased human disturbance to wildlife would occur. As a result, the impact to the Preservation area of the Saddle Mountains Unit of the Hanford Reach National Monument and the Hanford Site would be moderate. (See Table 4.6-2, *Preferred Alternative – Land Use Impacts*.)

Table 4.6-2
Preferred Alternative – Land Use Impacts

Land Use	Impact Level	Main Issue
Agricultural	High	Conversion of prime and non-prime farmlands to non-farmland use
Residential	High	Log cabin vacation residences and planned 200-acre subdivision
Quarry	Moderate	May affect quarry operations
BLM	Low	Rangeland and recreational uses
DNR	Low	Rangeland AND Agricultural land crossed by double-circuit construction method and rangeland
YTC	Moderate/Low	Military maneuvers already structured around the presence of existing transmission lines
USFWS	Moderate	Disturbance to wildlife and wildlife habitat
Hanford Site	Moderate	Impacts area of refuge for wildlife by expanding an existing utility corridor through an area designated for Preservation
Overall Impact from Preferred Alternative MODERATE to HIGH		

4.6.4 Alternative 1

For a discussion of land use impacts associated with Segment A, please see Section 4.6.3.1, *Segment A*.

4.6.4.1 Segment B (Option B_{NORTH})

Option B_{NORTH} – The majority of B_{NORTH}, roughly 7.3 miles (76.6 percent), traverses the Johnson Creek Complex of the YTC with the remaining portion traversing roughly 1.75 miles of rangeland and a 0.48 mile of open water.

Reminder

gments A and B would have the lowing land use impacts:
sidential: High
ricultural: High
arry: Moderate
M: Low
NR: Low
C: Moderate/Low

***DOE** is the U. S. Department of ergy.*

The impact to rangeland would be low. There would be no impact to open water crossed because the transmission line would span water bodies.

As with Segment A, the existing transmission lines that Segment B would parallel through the Johnson Creek Complex, at a distance of 1,200 feet, were in place prior to this land area becoming part of the YTC. The U.S. military has tailored its use of this area to accommodate these existing transmission line facilities. Still, the new lines would create additional long-term impacts to the military training mission and would have an impact on land use and land use planning on the installation. Therefore, the impact to the YTC in this area would be moderate.

4.6.4.2 Segment E

Segment E crosses approximately 5.87 miles (25 percent) of agricultural land. Segment E would parallel an existing transmission line through agricultural areas. Roughly 2.7 miles of prime farmland would be crossed by this segment, resulting in an estimated 4.6 acres of impact to lands designated as prime farmland. Impacts to agriculture could be reduced by constructing new access roads along the edges of agricultural fields and by locating structures at the edges of fields or between crop circles. Even with these measures, it would not completely eliminate the conversion of agricultural land to a non-agricultural use. Therefore, the impact to agricultural lands would be high.

Segment E, the new and existing nsmission lines would have a paration of approximately 200 ft.

Roughly one mile of Segment E would cross through a section of the Columbia National Wildlife Refuge located on the north side of the Saddle Mountains and along the south side of Lower Crab Creek. Paralleling an existing transmission line through this area would result in a moderate impact due to some loss and degradation of wildlife

habitat, increased fragmentation, and increased human disturbance to wildlife.

Segment E would also cross a small portion of DNR administered land that is used predominantly for agricultural purposes. This land, approximately 0.56 mile, would experience the same impacts as the rest of the agricultural land. Therefore, impacts to DNR lands would be high.

There would be two residential structures located between the existing transmission line and Segment E. There would also be two separate migrant worker, residential compounds located between the two transmission lines. In one compound the structures would be over 200 feet from Segment E; the other compound would have structures within 200 feet of the transmission line. Locating the structures as far away from the compound as possible would allow the land use to continue. The impact to residential land uses would be low.

Segment E would parallel the existing Vantage-Hanford line through approximately 4.89 miles of BLM-administered land. This land is located north of the agricultural areas in Grant County and is the western end of the Saddle Mountains Management Area. BLM manages this land for multiple land uses, such as mineral resources, rangelands, recreation, and wildlife habitat. The area crossed by this segment is used predominantly as rangeland and wildlife habitat with some off-road vehicle recreation use. As with all rangeland crossed by the various segments, the impact to this land use would be low since the uses would be able to continue relatively uninterrupted. The impact to off-road vehicle use would also be low since the vehicles would be able to continue operating under and around the transmission facility. One of the six management objectives of the Saddle Mountains Management Area is to keep the public lands open for purposes such as rights-of-way. The impact to land uses on BLM lands along Segment E would be low.

Segment E would cross the Saddle Mountains Unit of the Hanford Reach National Monument before crossing the Columbia River and terminating at the existing Hanford Substation, which is approximately one-quarter mile from the Columbia River, on the Hanford Site. This area has a land use designation of Preservation for land within one-quarter mile of the Columbia

Reminder

Segment A would have the following land use impacts:
Residential: High
Agricultural: High
Quarry: Moderate
BLM: Low
DNR: Low
YTC: Moderate

Training maneuvers that occur in the complexes crossed on the YTC include force-on-force maneuver exercises; light infantry maneuver and small unit operations; live fire artillery, gunnery, and mortar training; and live fire training for infantry units, tanks, and helicopters.

For this document, agriculture is defined as row crops, pasture, fallow fields, orchards, crops and grains. Land that we refer to as rangeland is grassland and shrubland that may be used for grazing or the movement of livestock.

River and a designation of Industrial beyond one-quarter mile of the Columbia River. The policies of the Final Hanford Comprehensive Land Use Plan EIS state that existing utility corridor rights-of-way are the preferred routes for expanded capacity. Segment E would be a new utility corridor 1,200 feet north of an existing transmission line. The new corridor would result in an increased loss and degradation of wildlife habitat, increased fragmentation, and increased human disturbance to wildlife. As a result, locating Segment E through this area would have a high impact on the effort to preserve the ecological, archaeological, cultural, and natural resources of the area as well as the effort to utilize this area as a refuge for wildlife.

Alternative 1 would terminate at the existing Hanford Substation. There would be no impact from substation work since no new land outside the existing substation boundary would be needed.

The evaluation of impacts to various land uses shows Alternative 1 would have a high impact on agricultural and residential land uses. Alternative 1 would have a high impact to Washington State Department of Natural Resources (DNR) and U.S. Department of Energy (USDOE) land, which is managed by the USFWS. The DNR land covered is predominantly agricultural. Alternative 1 would convert some agricultural land to a non-agriculture use. Alternative 1 would create a new corridor through an area designated as Preservation by USDOE. (See Table 4.6-3, *Alternative 1 – Land Use Impacts*.)

Table 4.6-3
Alternative 1 – Land Use Impacts

Land Use	Impact Level	Main Issue
Agricultural	High	Conversion of prime and non-prime farmlands to non-farmland use. Double-circuiting not an option through prime and non-prime farmland
Residential	High	Log cabin vacation residences and planned 200-acre subdivision. Towers could be located to minimize impact.
Quarry	Moderate	May affect quarry operations.
BLM	Low	Rangeland, recreational uses, and wildlife habitat
DNR	High	Predominantly agricultural land
YTC	Moderate/Low	Military maneuvers already structured around the presence of existing transmission lines.
USFWS	Moderate	Disturbance to wildlife and wildlife habitat
Hanford Site	High	Impacts area of refuge for wildlife by constructing a new utility corridor through an area designated for Preservation
Overall Impact from Alternative 1: HIGH		

4.6.5 Alternative 3

For a discussion of land use impacts associated with Segment A, please see Section 4.6.3.1, *Segment A*.

4.6.5.1 Segment C

About 24.1 miles (80.9 percent) of Segment C is located on the YTC. Beginning where Segment A ends, this segment heads south through the Johnson Creek, Hanson, Alkali Canyon, Corral Canyon, and Cold Creek Training Complexes before exiting from the southeast corner of the YTC. Due to the steep slopes in the Alkali Canyon and Corral Canyon, supplies and support materials for maneuvers are delivered to exercises in the area via parachute drops.

When the military needs to run power to its training areas where live gunnery, artillery, and mortar fire training occurs, which is a stated use in three of the five complexes crossed by this segment, the military has a standing practice of burying their utility lines through those areas. Aboveground transmission lines would eliminate the ability to conduct live mortar fire exercises.

Overhead transmission lines would also affect the ability to operate low flying aircraft (helicopters, F-18s, and A-10s) that are used as ground support and the parachute drops used to bring in supplies. The presence of a transmission line would force ground maneuvers to work around the structures, which would break up the continuity of the maneuvers and reduce their effectiveness.

Unlike Segments A, B_{NORTH}, and B_{SOUTH}, Segment C would be a new transmission line in an area where training maneuvers are not currently setup to work around such facilities. It would eliminate the ability to have live gunnery, artillery, and mortar training and have a high affect on aviation and ground maneuvers. As a result, Segment C would have a high impact on the land uses in the YTC.

The portion of Segment C not located on the YTC crosses private rangeland and a small portion of rangeland administered by DNR (less than 0.5 mile) and BLM (about 0.2 mile), and approximately 0.01 mile of agricultural land. As with all rangeland crossed by the various segments, the impact to this land use would be low since the uses would be able to continue relatively uninterrupted. The total expected impact to agricultural lands would be less than one-half acre. None of this land is designated as prime farmland. Still, Segment C would convert agricultural land to a non-agricultural use and, therefore, the impact would be high.

Since the majority of Segment C would be located within the YTC, and would have such a high level of impact on military operations and maneuvers, the overall impact on land use for this segment would be high. (See Table 4.6-4, *Alternative 3 – Land Use A Impacts*.)

Alternative 3 would terminate at the new Wautoma Substation. This facility would require converting approximately 25 acres of agricultural land from an agricultural use to a utility use. Removing 25 acres of agricultural land from production would be a high impact.

Table 4.6-4
Alternative 3 – Land Use A Impacts

Land Use	Impact Level	Main Issue
Agricultural	High	Conversion of prime and non-prime farmlands to non-farmland use
Residential	High	Log cabin vacation residences and planned 200-acre subdivision
Quarry	Moderate	May affect quarry operations
BLM	Low	Rangeland
DNR	Low	Rangeland
YTC	High	Live gunnery, artillery, and mortar fire training, aviation maneuvers, and ground maneuvers
Overall Impact from Alternative 3: HIGH		

Reminder

Segments A and B would have the following land use impacts:
Residential: High
Agricultural: High
Quarry: Moderate
BLM: Low
DNR: Low
YTC: Moderate/Low

4.6.6 Alternative 1A

For a discussion of land use impacts associated with Segment A please see Section 4.6.3.1, *Segment A.* For a discussion of land use impacts associated with Segment B (Option B_{NORTH}) please see Section 4.6.4.1, *Segment B (Option B_{NORTH})).*

4.6.6.1 Segment F

Transmission structures and access road improvements along Segment F would impact less than three acres (approximately 2.9 acres) of agricultural land. None of this land is designated as prime farmland. By locating the structures and new access roads at the edge of fields, these impacts could be reduced. Still, some agricultural lands would be converted from an agricultural use to a non-agricultural use and, therefore, the impact to agricultural lands would be high.

There would be a small portion of DNR administered land crossed by Segment F, approximately 2.5 miles (7.8 percent). This land is predominantly rangeland. As it is on all line segments, the impact to rangeland would be low.

A large portion of Segment F, roughly 12.77 miles (39.7 percent), of the total segment, would run east-west through the Saddle Mountains Management Area administered by BLM. This segment would traverse nearly the entire length of this management area within new ROW. BLM manages this land for multiple land uses, such as mineral resources, rangelands, recreation, and wildlife habitat. The types of land use activities occurring in the area would be able to continue relatively uninterrupted under and around the new line. One of the six management objectives of the Saddle Mountains Management

Area is to keep public lands open for purposes such as rights-of-way. As a result, the impact to land use activities on BLM lands would be low.

Segment F would cross 7 miles of the Saddle Mountains Unit of the Hanford Reach National Monument before crossing the Columbia River and terminating at the existing Hanford Substation, which is approximately one-quarter mile from the Columbia River, on the Hanford Site. This area has a land use designation of Preservation for land within one-quarter mile of the Columbia River and a designation of Industrial beyond one-quarter mile of the Columbia River. Segment F would require new ROW 1,200 feet east of the existing Grand Coulee-Hanford line. The new corridor would result in a loss and degradation of wildlife habitat, fragmentation, and increased human disturbance to wildlife. As a result, Segment F would have a high impact on the effort to preserve the ecological, archaeological, cultural, and natural resources of the area as well as the effort to utilize this area as a refuge for wildlife.

The impact to agricultural lands and the Saddle Mountains Unit would be high. However, due to the limited amount of agricultural lands that will experience a high impact (just over 1 percent of the total lands in Segment F), and since the Saddle Mountains Unit lands are less than 25 percent of the total lands crossed by the segment, the overall impact to land uses from Segment F would be moderate. (See Table 4.6-5, *Alternative 1A – Land Use Impacts*.)

Alternative 1A would terminate at the existing Hanford Substation. There would be no impact from substation work since no new land outside the existing substation boundary would be needed.

Table 4.6-5
Alternative 1A – Land Use Impacts

Land Use	Impact Level	Main Issue
Agricultural	High	Conversion of agricultural land to non-agricultural land use
Residential	High	Log cabin vacation residences and planned 200-acre subdivision
Quarry	Moderate	May affect quarry operations
BLM	Low	Rangeland, recreational uses, and wildlife habitat
DNR	Low	Rangeland
YTC	Moderate/Low	Military maneuvers already structured around the presence of existing transmission lines
Hanford Site	High	Impacts area of refuge for wildlife by constructing a new utility corridor through an area designated for Preservation
Overall Impact from Alternative 1A: MODERATE to HIGH		

4.6.7 No Action Alternative

The impacts currently associated with the ongoing operations and maintenance activities for the existing transmission line, substations, and ROW would continue. However, under this alternative, no new impacts to land uses would be expected.

4.6.8 Recommended Mitigation

- Work closely with the various land managers and landowners to minimize conflicts and inconvenience from construction and maintenance activities.
- Locate the new line as far away from residential and commercial land uses as possible.
- Locate structures outside of agricultural fields and on the edges of existing roads where possible or next to existing structures.
- Construct new access roads around agricultural fields and in locations that may benefit the landowner.
- Schedule activities to avoid or minimize crop damage.
- Keep gates and fences closed and in good repair to contain livestock.
- Compensate farmers for crop damage, help them control weeds and restore compacted soils.
- Enter into special agreements with landowners to allow the growing of ornamental or orchard trees as well as other structure-supported crops under the transmission lines.
- Strive to meet substantive requirements of Benton, Grant, Kittitas, and Yakima County development regulations.

4.6.9 Cumulative Impacts

The expansion of utilities and other non-agricultural land uses would lead to further removal of valuable agricultural lands and rangelands from production, resulting in an incremental increase in lands lost to previous development and to future development that were not necessarily intended to be used for utilities.

This region of Washington, especially Kittitas County due to its proximity to the Seattle urban area, is experiencing an increase in new rural residential structures being constructed by people seeking the benefits of rural living and as vacation homes or resort destinations. As the rural areas are developed for purposes other than agricultural, more people will be living in proximity to the

transmission lines. Expanding utility infrastructure in these areas will continue to cause conflicts with various land uses.

Expanding the transmission system in this region may also contribute to the gradual urbanization of the rural landscape. As more power becomes available, areas may begin to experience an increase in development. This new development would impact agricultural and range lands by decreasing the quantity of this land available for production.

The miles of improved and new access roads, necessary in order to gain access to transmission lines during maintenance and repair activities, would provide increased access opportunities to areas previously inaccessible by motorized vehicles. These new roads could lead to increased recreational activities such as hunting, wildlife viewing, and off-road vehicle operating in areas unaccustomed to such activities. This increased activity would impact the existing use of the land for preservation or natural habitat purposes.

Aside from increased access opportunities into certain preservation areas, establishing a new ROW through an area such as the Saddle Mountains Unit of the Hanford Reach National Monument may make it easier to construct future lines through the same corridor. As the number of transmission lines through the area increases, the ability to successfully preserve the ecological, archaeological, cultural, and natural resources of the area may decrease.

4.7 Socioeconomics

4.7.1 Impact Levels

A **positive** impact would occur when an alternative produces one or more of the following effects: provides employment, increases tax revenues, increases property values, or creates other similar effects on the social and economic vitality of affected communities.

A **negative** impact would occur when an alternative produces one or more of the following effects: reduces employment, reduces a tax base, takes land out of production without compensation, exceeds current capacities for housing and public services, or creates other similar effects on the social and economic vitality of affected communities.

No impact would occur if employment levels, tax revenues, property values, land production, demand for housing and public services, or other similar effects remain unchanged or would be of short duration.

4.7.2 Population

Constructing a new transmission line would not encourage population growth in the area, but rather would be a response to growth that is already occurring in central Washington and the Pacific Northwest. The local population has not and would not increase because of the availability of electric power. However, population growth would likely slow and could lead to a population decline if transmission system capacity is not increased (see also Section 4.7.12, *No Action Alternative*).

From an assessment of ***demographic*** data and aerial photography, it has been determined that places where minority and low-income populations may reside, work, or otherwise spend large parts of their days are not highly or disproportionately concentrated within the study area. None of the alternatives would have a detrimental effect on minorities or economically disadvantaged groups in the area (see also Section 5.8, *Executive Order on Environmental Justice*).

No impact to the population would occur as a result of the proposed project.

4.7.3 Economy and Industry

Because transmission line construction requires specialized labor, construction crews would likely be brought in from outside the local area. Specialized workers may come from outside the region such as Spokane or Seattle, Washington; Portland, Oregon; Boise, Idaho; or

from other parts of the United States or the world. The primary construction contractor may hire local contractors to fill less specialized roles such as roadwork and ROW clearing.

Construction would likely occur over one year, with one or two primary contractors. About 100 people would be needed to construct a project of this scale on this timeline. This would be a positive impact on employment in general, but not necessarily a local impact if workers do not come from the study area.

Constructing a new transmission line would not impact the distribution of jobs within industry sectors, personal and household incomes, or industry earnings.

4.7.4 Housing and Public Services

Socioeconomic impacts to temporary housing facilities are relatively minor for transmission line construction projects in most areas. Most construction workers would likely provide their own housing (e.g., campers and trailers) or seek temporary commercial lodging. Recreational vehicle (RV) parks are available throughout the area. These facilities are typically available by the day, week, month, or season. Because of the relatively small number of construction crews who would build the project, there should be few negative impacts to the temporary housing supply in the area.

Impacts to public services such as police, fire, and medical response, would be of short duration during the construction phase.

4.7.5 Retail Sales and Use Tax

The major cost of any transmission line project is labor and materials. A combined state and local sales and use tax would be levied on materials purchased for the project by the contractor. Although BPA, as a federal agency, is exempt from Washington state taxes, they agree to pay a fee to the counties based on the materials purchased for the project. This fee is generally 7.8 percent, or approximately $2,400,000. This would be a positive impact to local and state revenues.

The sales and use tax would also be assessed on incidental purchases by the contractor, crews, and subcontractors. Because crews would be in the area only temporarily, incidental purchases would be limited to provisions such as food (tax exempt), lodging, fuels, tools, clothing, and other minor purchases. These purchases would be in small amounts and any sales or use tax collected would be a positive but minor impact.

4.7.6 Business and Occupation Tax and Public Utility Tax

For Business and Occupation (B&O) tax purposes, contractors performing work for BPA are classified as government contractors and are subject to the B&O tax. The gross contract price is subject to this tax. Therefore, the Preferred Alternative would generate about $145,000 in B&O tax. Other alternatives would result in similar amounts of tax. This would be a positive impact to state revenues.

Final distribution of a utility is subject to the public utility tax. BPA is exempt from this tax; thus no impact to the state or local revenues would result.

4.7.7 Property Tax

BPA, as a federal agency, is exempt from paying local property taxes. None of the alternatives would impact local property tax revenues, except in the case of acquiring real property to build a new substation.

The Preferred Alternative and Alternative 3 would terminate at a new substation site. Any land purchased by BPA to construct a new substation would reduce the taxable land base. The extent of this reduction is approximately 25 acres for the substation and would be for the duration of the facility, which is about 50 years. The corresponding tax revenues for this acreage reduction is $20.24 based on the state average millage tax rate of $10.12 for every $1,000 of value. Losses to the taxable land base would have a small negative impact on local counties and to an even lesser extent on the state school fund.

Alternatives 1 and 1A would terminate at the existing Hanford Substation, which would be expanded to make room for an additional bay. Enough land is already available and owned by BPA to expand this substation. No additional land would be needed at Schultz, Vantage, or Midway Substations. Therefore, no impact to local or state property tax revenues would occur.

4.7.8 Property Value

Any new transmission line or access road easements would be appraised, and landowners would be offered the fair market value for these land rights. Some short-term adverse impacts on property value and salability along the new ROW may occur on individual properties. However, these impacts are highly variable, individualized, and unpredictable. The new line is not expected to cause overall long-term adverse effects on property values. See

Appendix D, *Property Impacts*, for more information on impacts to property values.

4.7.9 Land Taken Out of Production

Activities such as farming, that do not interfere with the transmission line or endanger people, are usually not restricted.

In cases where productive lands cannot be avoided, some land may be taken out of production. This includes the placement of structures in productive lands, reduction in irrigated land use (i.e., reconfigured irrigation circles), and locating the new Wautoma Substation in productive land. Constructing new towers in productive lands and changes to existing irrigation circles would have a negative impact on individual landowners. Locating the new Wautoma Substation in productive lands would take up to 25 acres of land out of production; a negative impact to taxable land base. Landowners would be compensated for any lands taken out of production.

4.7.10 Other Taxes

Reminder

Excise *taxes are internal taxes imposed on the production, sale, or consumption of a commodity the use of a service.*

Other state taxes that would be assessed include ***excise*** taxes on fuel, cigarettes, tobacco products, liquor, timber, and rental cars. Local excise taxes that would be applicable to the project include hotel/ motel taxes and municipal taxes and licenses. The contractor, crews, and subcontractors would likely bear the expense of these taxes. Revenues generated from these miscellaneous taxes would have a positive impact on state and local revenues, but are expected to be small due to the limited crew size involved in this type of construction.

Sales of privately owned property to BPA for a new substation would be subject to the real estate tax. The seller pays this tax. Local real estate revenues generated by the project would have a small, positive impact on local counties.

4.7.11 No Action Alternative

The No Action Alternative would not directly or indirectly impact the local population, economy, or tax base. However, this alternative would have other socioeconomic impacts to the local area and greater region, as a result of the lack of adequate transmission line infrastructure to support expected growth in the Pacific Northwest. The lack of transmission capacity could cause seasonal localized power deficiencies. The development of clean power generation in areas that can support it may be offset by combustion generation closer to load centers.

The No Action Alternative would potentially have negative socioeconomic effects in the greater Pacific Northwest region.

4.7.12 Recommended Mitigation

- BPA would compensate private landowners for the fair market value of any land taken out of production.
- BPA would work with landowners and land managers to site the new line to minimize impacts.

4.7.13 Cumulative Impacts

It is unclear whether the introduction of more transmission capacity would be a catalyst to population growth. Other infrastructure (such as water or sewer), local economies, and employment opportunities would play an important role in whether an area can absorb population increases. The alternatives could contribute, along with other factors, to increased growth in the region.

4.8 Visual Resources

Reminder

Visually sensitive locations have been identified based on their visual quality, uniqueness, cultura significance, or viewer characteristics (Sevi, USDOT/ FHWA Memo "Esthetics and Visu Quality", 8/86).

Potential impacts to visual and aesthetic resources consist of a combination of changes in the visual environment and their effect on viewers who are sensitive to these changes. Transmission line projects are generally not perceived as providing visual enhancement to the landscape. However, they can be built in ways that minimize visual impacts so that their benefits (i.e., improved service reliability, increased transmission capacity, and new jobs) can be realized.

The following analysis discusses areas that are considered typical to this project, for which visual simulations have been created. Three locations within the project area were determined to be Visually Sensitive Locations. Visual simulations were also created for these sensitive locations and the viewpoint for each is shown on Map 10, *Visual Analysis*.

4.8.1 Impact Levels

Although the visual resource impacts of transmission line projects are not locally regulated within the study area, the construction of a new transmission line will change the physical appearance of the landscape and affect viewer groups. To assess the visual impacts of this project, the following set of criteria was used.

Impacts would be considered **high** where:

- the transmission line(s) would become a view's dominant feature or focal point.
- a large number of highly sensitive viewers would see the line(s) in predominantly the ***foreground*** and ***middleground***.

Foreground*: within 0.25 to 0.5 mile of the viewer*

Middleground*: from the foreground to about five mile of t viewer*

Impacts would be considered **moderate** where:

- the transmission line(s) would be clearly visible but not the dominant feature of the view.

Background*: over five mile from the viewer*

- a large number of sensitive viewers would see the line(s) mostly in the middleground.

Impacts would be considered **low** where:

- the transmission line(s) would be somewhat visible but not evident in the view.
- few sensitive viewers would see the transmission line(s) because they would be either screened or predominantly seen in the middleground and **background**.

No impact would occur where:

- the transmission line would be isolated, screened, not noticed in the view, or seen from a great distance.
- views would be of short duration.
- no visually sensitive resources would be affected.

4.8.2 Impacts Common to Construction Alternatives

Transmission line facilities would be seen from a variety of potential viewpoints along all of the proposed routes, including private residences, highways, and recreation areas. The construction, operation, and maintenance of the proposed transmission line and substation facilities would have short- and long-term effects on visual resources. Structures, conductors, insulators, spacers, aeronautical safety markings, vegetation clearing, access roads, ground preparation for structures, and pulling sites for the conductor would all create visual effects. A transmission line's visual presence would last from construction throughout the life of the line.

4.8.3 Preferred Alternative (Alternative 2)

The Preferred Alternative is made up of sagebrush and agricultural landscapes. View 1 (Photo 4.8-1) simulates crossing the Vantage Highway in Segment A. See Map 10, Visual Analysis, for location. The sagebrush terrain is characteristic of most of Segments A and B. In this location, the addition of a new line would be clearly visible and would briefly extend the motorist's visual experience of the transmission corridor, but it is expected that sensitive viewers will not find this objectionable because the additional line would not become the dominant feature of this relatively common view.

Photo 4.8-1. Visual simulation of Segment A crossing Vantage Highwa
(General View 1 — See Photo 3.9-5 for original photo)

The area near Colockum Pass (Segment A) is a Visually Sensitive Area due to the number of residences with foreground views of the transmission line project (see photo below and location of Viewpoint A on Map 10, *Visual Analysis*). In the Colockum Pass area, Segment A would pass close to a number of residences whose owners have expressed concerns about the visual impact of the project. Residential viewers would notice the additional structures and conductors during and after construction. However, the proposed structures would not dominate or become the focal feature because they would be located parallel to an existing transmission line that already impacts the views.

Photo 4.8-2. Visual simulation looking northeast and east along Gage Road towa
(Visually Sensitive Viewpoint A — See Photo 3.9-1 for original ph

Visual impacts to this Visually Sensitive Area would be moderate.

The reroute in Segment A is in the area of the Colockum Pass Visually Sensitive Area. The reroute would result in both the existing and new transmission lines being located closer to Gage Road and to some viewers. The transmission line structures would be parallel to Gage Road on the north side, closer than what is shown in Photo 4.8-2. Moving the transmission line to the south would still result in a moderate impact to this Visually Sensitive Area.

View 2 (Photo 4.8-3) simulates crossing the Columbia River, south of the Wanapum Dam in Segment B. It illustrates how the addition of a new line would replicate the visual experience of the existing line and transmission ROW. It is expected that sensitive viewers will not find this objectionable, since the additional line would not become the dominant feature in this view.

imulation of Segment B looking west across the Columbia River near the Vantage Substation (General View 2 — See Photo 3.9-7 for original photo)

The north face of the Saddle Mountains (Segment D) near the Columbia River and Lower Crab Creek is a Visually Sensitive Area due to its unique and striking landform, relationship to adjacent water bodies, and the number of viewers on Route 243. See photo 4.8-4 below and location of Viewpoint B on Map 10, *Visual Analysis*.

In this area, the new transmission line would be clearly visible (primarily in the middleground) to most viewers including residents, tourists, and recreationalists traveling through the area. Three of the alternatives would scale the Saddle Mountains in this general area. The Preferred Alternative would be closest to most viewers. Viewers would notice the additional structures and conductors during and after construction, but the transmission line would not become the dominant feature in any view. There are existing transmission lines in the area, and the scale of the mountain would greatly minimize the perceived size of the proposed structures.

Visual impacts in this Visually Sensitive Area would be moderate.

Photo 4.8-4. Visual simulation looking east to Saddle Mountains from Hi
(Visually Sensitive Viewpoint B — See Photo 3.9-2 for original pho

Overall, the impact to visual resources would be low to moderate for the Preferred Alternative. Visual impacts for the majority of the alternative would be low excluding the two Visually Sensitive Locations where the impacts would be moderate.

4.8.4 Alternative 1

Impacts to visual resources along Segment A and B would be the same as described for the Preferred Alternative.

In Segment E, the new transmission line would cross a combination of agricultural fields and sagebrush landscape. Where Segment E climbs the north face of the Saddle Mountains is a Visually Sensitive Area similar to the area seen in

Viewpoint B, above. Alternative 1 would be slightly further from the road than the Preferred Alternative. Viewers would notice the additional structures and conductors during and after construction, but the transmission line would not become the dominant feature in any view. There are existing transmission lines in the area, and the scale of the mountain would greatly minimize the perceived size of the proposed structures.

Visual impacts to this Visually Sensitive Area would be moderate.

Overall, the impact to visual resources would be low to moderate for Alternative 1. Visual impacts for the majority of the alternative would be low with a two Visually Sensitive Areas where the impacts would be moderate.

4.8.5 Alternative 3

Impacts to visual resources along Segment A would be the same as described for the Preferred Alternative.

There would primarily be two sets of viewers of Segment C. Army personnel on maneuvers would have a foreground view of the new transmission line; however, these viewers are not deemed to be sensitive to aesthetics while on maneuvers. The other set would be viewers from across the Columbia River. There is no existing line in the area that Segment C would be built; therefore, Segment C would change an existing landscape view. The new transmission line would be in the mid- to background for most of these viewers, and due to the varied terrain elevation, sitings of the towers and conductors would not be continuous. Impacts to Segment C would be low to moderate.

Overall, the impact to visual resources would be low to moderate for Alternative 3. Visual impacts for the majority of the alternative would be low with one Visually Sensitive Area where the impacts would be moderate.

4.8.6 Alternative 1A

Impacts to visual resources along Segment A and B would be the same as described for the Preferred Alternative.

In Segment F, the new transmission line would cross the south face of the Saddle Mountains and sagebrush landscape. Where Segment F climbs the north face of the Saddle Mountains is a Visually Sensitive Area similar to the area seen in Viewpoint B

(Photo 4.8-4). Alternative 1A would be farther east than the other alternatives and in an area that does not have existing transmission lines. View 3 simulates looking across Lower Crab Creek at Segment F ascending the north face of the Saddle Mountains (Photo 4.8-5). Although the new line would be clearly visible and impact a seemingly undisturbed portion of the mountain, the large scale of the landform dominates the view. Furthermore, it would also be in an area that would not have as many viewing opportunities.

Visual impacts to this Visually Sensitive Area would be moderate.

Photo 4.8-5. Visual simulation of Segment F ascending the north face of Saddle Mountai (General Viewpoint 3 — See Photo 3.9-17 for original photo)

Due to its striking landform and recreational value, the Saddle Mountains Ridgeline is considered a Visually Sensitive Area (Viewpoint C on Map 10, *Visual Analysis*). Locating the transmission line on top of the ridgeline would change the view of the landform and have a high visual impact. However, locating Alternative 1A near the base of the mountains would easily mitigate this sensitivity. A simulation of this placement is shown in Photo 4.8-6, below.

With proposed placement of line, visual impacts would be low.

'isual simulation looking northwest towards Saddle Mountains from Wahluke Slope (Visually Sensitive Viewpoint C — See Photo 3.9-3 for original photo)

View 4 (Photo 4.8-7) simulates Segment F, looking north toward the Saddle Mountains (See Map 10, *Visual Analysis*, for location). The structure in the middle of the photo is part of the existing line, the new line simulation is on the left. Although the addition of a new line would replicate the visual experience of the existing line and transmission corridor (which is clearly visible but not the dominant feature), this view will be seen by relatively few viewers.

Photo 4.8-7. Visual simulation looking north toward the Saddle Mountains, of Segment F, parallel to the Grand Coulee-Hanford transmission line (General View 4 — See Photo 3.9-19 for original photo)

Overall, the impact to visual resources would be low to moderate for Alternative 1A. Visual impacts for the majority of the alternative would be low with three Visually Sensitive Locations where the impacts would be moderate for Viewpoints A and B, and low for Viewpoint C.

4.8.7 No Action Alternative

Existing transmission lines would continue to be seen from a variety of views. Visual effects would continue as they currently exist.

4.8.8 Recommended Mitigation

Mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigation measures include:

- using a non-specular conductor and insulator to reduce visual impacts that cannot be avoided in sensitive areas.
- locating facilities in relationship to landforms so that they will screen transmission line features.
- avoiding highly erodable soils, if possible.
- revegetating disturbed areas with native plant communities.

4.8.9 Cumulative Impacts

Generally, the construction of additional structures, lines, roads and substations would add physical features (and thus, visual effects) to the landscape. Cumulatively, although these effects are considered minor, they will alter and contribute to an ever-increasing manmade visual presence on the natural landscape of the study area.

4.9 Recreation Resources

4.9.1 Impact Levels

Impacts would be considered **high** where transmission facilities would:

- preclude existing or planned ***dispersed*** recreational uses during and after construction of transmission lines or access roads.
- alter or eliminate ***dedicated*** recreational activities during and after construction of transmission lines or access roads.

Impacts would be considered **moderate** where transmission facilities would:

- temporarily preclude or limit dispersed and dedicated recreation opportunities during peak use periods, during construction of transmission line and/or access roads.

Impacts would be considered **low** where transmission facilities would:

- temporarily preclude or limit dispersed and dedicated recreation opportunities during off-peak use periods during construction of transmission line and/or access roads.
- require minor relocation of dispersed recreational activities to equal or better location during or after construction of transmission line and/or access roads.

No impact would occur to recreation areas if there was no effect upon the location or safety of recreational uses during and after construction.

4.9.2 Impacts Common to Construction Alternatives

All of the alternatives would have temporary impacts related to construction. For safety reasons, during construction, recreation would not be allowed within the construction area. This could result in a temporary closure of existing access roads and trails and, consequently, temporarily limit access to some recreation areas. During conductor stringing, activities such as sightseeing, watersports, and boating would be limited in the construction area.

Dispersed recreation such as hunting, off-road vehicle use, fishing, hiking, ***rock hounding***, horseback riding, camping, snowshoeing, snowmobiling, sightseeing, wildlife viewing, falconry, mountain

biking, bird watching, hang gliding, paragliding, and field dog training and trials might experience low impacts during construction. Although peak season for these activities correlates with the typical construction season, potential impacts are considered low because these dispersed activities aren't limited to a specific area and could undergo a minor relocation without much interruption.

The low intensity nature of most dispersed activities could allow them to continue even within close proximity to construction. In particular, fishing, hiking, rock hounding, horseback riding, camping, snowshoeing, sightseeing, wildlife viewing, falconry, bird watching mountain biking and some watersports are all unmotorized activities that move at relatively slow speeds and can therefore quickly adjust for minor disturbances.

The reroute in Segment A would not increase the level of impact to recreational activities.

Following construction of transmission lines and access roads, recreation activities may resume without impacts. Recreational use of areas that were temporarily closed during construction would resume as before construction. Also, with improved and/or additional access roads, better connections to recreational opportunities may be made available.

4.9.3 John Wayne Trail

All construction alternatives would cross the John Wayne Trail at least once. The trail, which follows the old railroad grade, is in a series of cuts and fills in the area of Segments B_{NORTH}, B_{SOUTH} and C. Views are limited approximately 50 percent of the time by the cut walls on either side of the trail. From fill portions of the trail, two other transmission lines are easily seen. B_{NORTH} would cross the trail in two places, with the view being localized to the crossings. B_{SOUTH} would follow on the south side of the trail and an existing transmission line. Impacts to the trail would be low. The trail in the area of these segments would be temporarily closed during construction.

Photo 4.9-1. John Wayne Trail along Segment B_{SOUTH}

Once the transmission line is constructed, users of the trail will continue to use the trail as before. There would be short-term evidence of construction activities until disturbed areas are revegetated.

4.9.4 No Action Alternative

No impacts would be expected to recreation resources under this alternative.

4.9.5 Recommended Mitigation

- During construction, provide information at trailheads informing recreationalists of any trail reroutes and any intensive construction in the area so recreationalists can plan accordingly.
- On public lands, designate restricted areas for hunting and off-road vehicles during construction and communicate with hunting and off-road vehicle user groups.
- Inform local visitor associations of potential delays along major roadways.
- Discuss locations of new structures, conductor lines, and access roads with land managers and owners in order to avoid sensitive recreation areas.

4.9.6 Cumulative Impacts

Generally, this region of Washington is rural in nature and is characterized by agricultural uses and striking natural landforms. However, it is experiencing increased development growth by people looking for the benefits of rural living and as a vacation destination. The construction of a new transmission line would add physical features to the landscape and contribute to the ever-increasing manmade presence on the natural landscape. All of these factors affect the type and experience of recreation activities.

Development provides access opportunities to areas previously inaccessible. New access roads could lead to increased recreational opportunities such as hunting, wildlife viewing, sightseeing, and off-road vehicle operating in areas unaccustomed to such activities.

Providing access to new areas reduces the areas available for recreationalists looking to experience nature.

4.10 Cultural Resources

This section assesses the project's potential impacts on cultural resources in the study area. This assessment is based on information gathered from:

- literature searches.
- compilation and assessment of records and reports of sites that would be potentially impacted by the four route alternatives.
- identification of areas that have a high probability of containing cultural sites, but which have not been surveyed.
- a comparison of potential impacts to these sensitive areas.

A discussion of both generalized and site-specific impacts is included in this section, and general recommendations for mitigation of potential impacts are presented.

4.10.1 Impact Levels

Because cultural resources are considered invaluable, any impact to them would be considered to be equally important. For this reason, we have not given potential impacts the relative ratings of high, medium, or low, but discuss them in general terms.

4.10.2 Impacts Common to Construction Alternatives

Any ground-disturbing activity within the boundaries of a significant cultural resource would be destructive, resulting in the permanent, irreversible, and irretrievable loss of scientific information and/or cultural value.

Non-ground-disturbing activities, such as cutting vegetation and road easements, may or may not have negative impacts on cultural resources depending on the type of resource involved and the proximity of the activity to the resource.

4.10.2.1 Construction

New Right-of-Way – The addition of new ROW would potentially affect cultural resources by changing access and use. In general, grants of easement for new ROW could increase public access and use of areas that were previously restricted or difficult to access. Increased access and use could have negative impacts on traditional cultural properties and sacred sites by interfering with natural auditory features and ***viewsheds***. Increased access could also contribute to an increase in the rate of vandalism and disturbance to archaeological and historic sites.

Clearing Vegetation – The clearing of vegetation may include ground-disturbing and/or non-ground-disturbing activity. As stated before, ground-disturbing activity within the boundaries of significant cultural resources would be destructive and could result in permanent, irreversible damage. Non-ground-disturbing vegetation clearing may result in damage to cultural resources through the compaction of cultural deposits within archaeological sites and historic sites.

Clearing vegetation, with or without ground disturbance, would affect most types of ***traditional cultural properties (TCP)***. Natural vegetation is an integral part of many TCPs, including traditional gathering areas, and may be relevant to some sacred sites as well. Clearing vegetation in a traditional gathering area or within the viewshed of a ***vision quest*** site would most likely have a negative effect on these resources.

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Natural and modified vegetation is also often a critical component of cultural landscapes. Clearing or cutting vegetation in these areas would have some impact on these resources, although the nature and extent of the effect would depend on the specific resource.

Grading and Backfilling – Grading and backfilling are ground-disturbing activities that would most likely result in permanent, irreversible damage to archaeological and historic sites. These activities include, but are not limited to:

- preparation of construction sites and staging areas
- materials delivery
- road and structure construction
- site restoration and clean-up
- ongoing project maintenance

Traditional cultural properties and cultural landscapes could also be negatively affected, although the nature and extent of these effects would depend on the specific resource. Impacts could vary in degree, from some restorable or replaceable negative effects to permanent damage. The source locations of materials used in backfilling and road construction would need to be surveyed before being disturbed.

Use of Heavy Equipment – In addition to the impacts caused by ground-disturbing activities, compaction caused by heavy machinery can cause the destruction of archaeological and historic sites and traditional cultural properties. This compaction damage would most likely be irreversible.

The use of heavy equipment would also cause auditory and visual disturbance to some TCPs and sacred sites. In addition, the continued use of heavy equipment near a sacred site (such as a vision quest site) would make the site unusable for contemporary Native American practitioners.

Reseeding – Reseeding would in most cases have little effect on archaeological and historic sites, depending on the methods used. Reseeding could impact TCPs and cultural landscapes by changing the existing vegetation stands or communities. (see *Clearing Vegetation*, above.)

Construction of Structures – The construction of structures is a ground-disturbing activity that could result in permanent, irreversible damage to archaeological and historic sites, and could also threaten burial sites. Construction of structures at the location of TCPs and cultural landscapes could have negative effects on these resources.

Construction within the viewshed of TCPs and cultural landscapes could also have negative effects. These could include a temporary negative effect due to increased auditory and visual disturbance during construction activities, but could also include permanent auditory and visual disturbances (e.g., the disruption of the natural view, and artificial noise caused by transmission lines). The nature and extent of these effects would depend on the specific resource as well as the nature and proximity of the structure, and could vary from some restorable or replaceable negative effects to permanent damage.

Conductors, Overhead Ground Wires, and Insulators – The presence of conductors, overhead ground wires, and insulators would probably have little to no direct effect on archaeological and historical sites. However, the long-term effects of electric or magnetic field exposure to specific data types encapsulated in archaeological deposits or artifacts (e.g., the chemical integrity of base and botanical materials and residues) has not been explored. Visual effects may impact TCPs and cultural landscapes; but these impacts would depend on the nature and proximity of the resource, and may vary from some modifiable effect to permanent and irreplaceable damage.

Access Roads – Access road repair, improvement, and construction could affect cultural resources through ground disturbance, compaction, changes in access or use, or changes in the auditory and/or visual setting. These effects are discussed above in *New Right-of-Way*.

4.10.2.2 Operation and Maintenance Activities

Ongoing operations and maintenance could have an impact on cultural resources. The nature and extent of these impacts would depend on the type and proximity of the resource and the specific activity involved, and could vary from insignificant effects to permanent, irreversible damage.

4.10.3 Site-Specific Impacts

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Because impacts from the proposed project and appropriate mitigation measures would vary (depending on the specifics of each cultural resource), site-specific impacts must be considered when evaluating alternatives.

Site-specific information will be lacking until a field survey and analysis is completed. Because of this, the following analysis is limited to anticipated potential impacts to currently recorded sites and unsurveyed areas that have a high probability for having significant cultural resources. These areas, collectively referred to as 'sensitive areas', may potentially be impacted by project activities.

Sensitive areas contain resources that are protected under federal law. Field surveys would be required in order to verify anticipated site-specific impacts. The following Table 4.10-1, *Summary of Sensitive Areas by Alternative***,** summarizes the number of culturally sensitive areas per alternative. This table shows only the sensitive areas that are known through the literature search performed. The actual presence or absence of sensitive areas will be determined through field surveys.

Table 4.10-1
Summary of Sensitive Areas by Alternative

Alternative	Number of Sensitive Areas	Total Area
Preferred 2	36	7.2 mi^2
1*	36	7.4 mi^2
3	38	8.0 mi^2
1A*	38	7.8 mi^2
No Action Alternative	No new or additional areas	

*B_{SOUTH} would increase the number of known sensitive areas by 2 for Alternatives 1, and 1A. The total area would increase by 0.3 mi^2 for the same alternatives.

Sensitive areas indicate the presence of potentially affected resources that should be avoided. When unavoidable, they should be mitigated. Although some resources would inevitably be affected by the proposed project, most of the potentially affected resources would be avoidable if given due consideration. The Preferred Alternative would have the least impact to sensitive areas. The reroute in segment A would not change the number of sensitive areas for any alternative.

4.10.4 No Action Alternative

The No Action Alternative would not cause any ground-disturbing or clearing activities. While the continued operation and maintenance of the existing lines will continue to impact cultural resources, the No Action Alternative includes no new or additional impacts.

4.10.5 Recommended Mitigation

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The mitigation measures for adverse effects to cultural resources presented here are, by necessity, general in nature because field identification and assessment of resources has not yet taken place. Mitigation measures are discussed in terms of resource types.

As required for compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the National Environmental Protection Act (NEPA) and Executive Order 13007, BPA would consult with the following groups concerning recorded cultural resources, their management, and potential impacts that the proposed project could have on them:

- the Washington State Historic Preservation Officer (SHPO) through the Office of Archaeology and Historic Preservation (OAHP)
- affected Native American tribes
- the owning federal agency, if discoveries made on federal lands
- local governments
- the public

In general, the best means of mitigating effects to significant cultural resources is to protect them where they are located. Impacts to these resources can be greatly reduced by simply avoiding contact with them. Although avoidance cannot replace protection measures in cases of deteriorating conditions, avoiding impacts from project

construction, operation, and maintenance activities should be standard practice whenever feasible.

If cultural resources are discovered in the course of project activities, work in the immediate area would cease and the area would be secured until appropriate actions have taken place. In such cases, the SHPO and the affected Native American tribes would be notified immediately, and a professional archaeologist who meets the Secretary of Interior's Qualifications Standards would examine the site and make recommendations to decision-makers for a course of action.

During work in areas where there is a high probability of encountering subsurface materials, a monitor would be present during ground-disturbing activities. It is imperative that confidential information be protected. This information includes details on the location and nature of cultural resources that may be endangered by looting, vandalism, or other negative impacts by the public. It may also include specific information on the use or practices associated with traditional cultural properties and sacred sites. Protection of confidential information relating to significant cultural resources is required under the ARPA.

Before construction, the following steps would be taken:

- Conduct an intensive cultural resources survey on the selected alternative.
- Evaluate potentially significant sites.
- Complete the National Register of Historic Places Determination of Eligibility forms.

Further information on procedures to be followed in order to protect cultural and historical sites can be found in Appendix H, *Phase I, Cultural Resources Assessment.*

4.10.6 Cumulative Impacts

Operations and maintenance would contribute to cumulative damage to cultural resources currently used by Native Americans, due to changes in access, use, and auditory and visual setting.

This and other projects in the area are providing monetary resources for the discovery of important cultural resources. The negative side of this is that as resources are discovered and become part of public knowledge, the possibility of their destruction becomes greater.

4.11 Public Health and Safety

Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. These precautions include building the lines to minimize shock hazard. All BPA lines are designed and constructed in accordance with the National Electrical Safety Code (NESC). NESC specifies the minimum allowable distances between the lines and the ground or other objects. These requirements determine minimum distance to the edge of the ROW, the height of the line, and the closest point to the line that houses, other buildings, and vehicles are allowed to be located.

People must also take certain precautions when working or playing near power lines. It is extremely important that people do not place potential conductors, such as TV antennae, irrigation pipes, or streams of water from irrigation, too close to the lines. BPA provides the free booklet *Living and Working Safely Around High Voltage Power Lines*, which describes safety precautions for people who live or work near transmission lines.

4.11.1 Impact levels

Impact levels are dependent on public and occupational use of the land. The potential for public health and safety impacts increases in areas where human activities take place.

A **high** impact would occur if:

- the new line precludes the use of the ROW for pre-existing activities.
- noise levels for the new line exceed existing state standards.

A **moderate** impact would occur if:

- the new line alters pre-existing ROW activities.
- residents are present and nuisance noise levels occur, exceeding **ambient noise** levels during a portion of the time.

A **low** impact would occur if:

- the new line would not produce a change in ROW activities.
- there would be no perceived change in noise levels.

4.11.2 Electric and Magnetic Fields

To quantify ***EMF*** levels along the alternatives, the EMFs from the new and existing lines were calculated using the BPA Corona and Field

Effects Program (USDOE, undated) for all alternatives. Minimum clearances were assumed to provide worst-case (highest) estimates for EMF levels. These worst-case conditions would seldom occur. See Appendix I, *Electrical Effects*.

The possible effects of EMF from transmission lines interacting with people on and near a ROW fall into two categories:

1. Short-term health and safety effects that can be perceived and may represent a nuisance: possible short-term effects are discussed below.

2. Possible long-term health and safety effects: The issue of whether there are long-term health effects associated with transmission line fields is controversial. In recent years, considerable research on possible biological effects of EMF has been conducted. Evidence that EMF exposures pose health risks is weak and there are no exposure standards based on long-term health effects. A review of recent studies and their implications for health-related effects is provided in a separate technical report, Appendix J, *Assessment of Research Regarding EMF and Health and Environmental Effects.*

4.11.2.1 Electric Fields – Short-Term Effects

Short-term effects from transmission line electric fields are associated with experiencing shocks from induced currents and voltages, and perceiving the electric field. Under certain conditions, induced current (spark-discharge) shocks can be experienced when a person contacts objects in an electric field. These effects occur in fields associated with transmission lines that have voltages of 230-kV or higher, and could occur under the new transmission line.

Primary shocks are those that can result in direct physiological harm. These shocks will not occur from induced currents under the existing or new lines, because clearances aboveground required by the NESC prevent large vehicles from these shocks, and grounding practices eliminate large stationary objects as sources of these shocks.

Secondary shocks are defined as those that could cause an involuntary and potentially harmful movement, but no direct physiological harm. Secondary shocks could occur under the proposed 500-kV line when making contact with ungrounded conducting objects such as vehicles or equipment. However, such occurrences are anticipated to be very infrequent. Shocks, when they occur under the 500-kV line, are most likely to be at a nuisance level.

Induced currents are always present in electric fields under transmission lines and will be present near the new line. However, during construction BPA routinely grounds metal objects located on or near the ROW. Grounding eliminates these objects as sources of induced current and voltage shocks. Induced currents are extremely unlikely to be perceived off the ROW of the new line.

Unlike fences or buildings, mobile objects such as vehicles and farm machinery cannot be grounded permanently. There are several ways to limit the possibility of induced currents from mobile objects to persons. First, required clearances for aboveground conductors tend to limit field strengths to levels that do not represent a hazard or nuisance. The NESC (IEEE, 1990) requires that sufficient conductor clearance be maintained in order to limit the induced short-circuit current in the largest anticipated vehicle under the line to 5 ***milliamperes*** (mA) or less. This can be accomplished by limiting access or increasing conductor clearances in areas where large vehicles could be present.

The BPA and other utilities design and operate lines in compliance with NESC standards. The NESC's 5-mA criterion would be met for perpendicular road crossings of the proposed line, and the conductor clearance at each road crossing would be checked during the design stage of the line to ensure that this criterion is met. In accordance with NESC standards, line clearances would also be increased in critical areas such as over railroads and water areas suitable for sail boating.

The potential impacts of electric fields could be mitigated through implementing grounding policies, adhering to NESC standards, and increasing clearances above the minimums specified by the NESC. Worst-case levels are used for safety analyses, but in practice induced currents and voltages are considerably reduced by unintentional grounding and by shielding provided by conducting objects, such as vehicles and vegetation.

Computer models were run to calculate electric fields for the different alternatives, the results of which can be found in Appendix I, *Electrical Effects.* The maximum calculated peak electric field expected for the new transmission line would be 8.9 kilovolts-per-meter (kV/m) or less, depending on the location along each alternative. These peak values are only directly under the line near mid-span, where the conductors are at the minimum clearance.

The largest values expected at the edge of the ROW nearest the new transmission line would be 2.0 kV/m. The largest fields at the edges of the existing ROWs are 5.2 and 2.0 kV/m for the 500- and 230-kV lines, respectively.

The existing 500-kV, 230-kV and 115-kV lines in the study area have peak electric fields of 9.7, 3.3, and 1.7 kV/m respectively. These would be the electric fields present if the No Action Alternative was chosen.

4.11.2.2 Magnetic Fields – Short-Term Effects

The magnetic field generated by currents on transmission line conductors extends from the conductors through the air and into the ground. The magnitude of the field at a height of 1 meter is frequently used to describe the magnetic field under transmission lines. The most important transmission line parameters that determine the magnetic field are conductor height above ground and magnitude of the currents flowing in the conductors. As distance from the transmission line conductors increase, the magnetic field decreases.

Computer models were run to calculate magnetic fields for the different alternatives, the results of which can be found in Appendix I, *Electrical Effects.* The field values on the ROW and at the edge of the ROW are given for projected maximum currents during summer peak load, for minimum and average conductor clearances. Field levels for the new line would be comparable with those for existing lines in the study area. The actual magnetic field levels would vary as currents on the lines change daily and seasonally and as ambient temperature changes. Average currents over a year would be considerably reduced from peak values. On the new ROW with no parallel lines and with the conductors at a height of 33 feet, the maximum magnetic field at 1 meter above ground is 244 milligauss (mG). For an average conductor height of 47 feet, the maximum field would be 137 mG. The maximum fields under the new line in the configurations with parallel lines would be less than these values.

At the edge of the new ROW, the calculated magnetic field for maximum current conditions would be 55 mG for conductor height of 33 feet and 46 mG for a conductor height of 47 feet. Fields at the edge of the ROW of the new line in configurations with parallel lines would be slightly more than those stated above. The field at the edge of the ROW adjacent to a parallel line would depend on that line.

The magnetic field falls off rapidly as distance from the line increases. The calculated magnetic field for maximum current would be less than 10 mG at about 185 feet from centerline of the new transmission line. At a distance of 200 feet from centerline, the field would be 8 mG for maximum current conditions.

The peak magnetic fields on the ROWs are 302 mG and 170 mG, for the 500-kV and 230-kV lines, respectively. Fields at the edges of the

existing ROWs range from 158 mG for the Schultz-Vantage 500-kV line to 7 mG for the North Bonneville-Midway 230-kV line, which has a very wide ROW. These would be the magnetic fields present if the No Action Alternative was chosen.

4.11.2.3 Health and Safety Impacts

Impacts from electric and magnetic fields are based on how the new line would potentially change activities presently occurring on the land that would become ROW. Farming activities are most commonly effected activity due to EMFs. Moving and operating irrigation systems must be done with care. The impacts shown in Table 4.11-1, *Health and Safety Impact Level*, are for each alternative by segment.

Table 4.11-1
Health and Safety Impact Level

	Seg A	Seg B	Seg C	Seg D	Seg E	Seg F	Overall Impact
Preferred (2)	Low/Mod	Low		Mod			Low/Mod
Alternative 1	Low/Mod	Low			Mod		Low/Mod
Alternative 3	Low/Mod		Low				Low
Alternative 1A	Low/Mod	Low				Low	Low

4.11.3 Noise

The Washington Administrative Code (WAC) provides noise limitations by class of property: residential, commercial, or industrial. Transmission lines are classified as industrial, and can cause the maximum permissible noise level of 60 decibels (dBA) to intrude into residential property. During nighttime hours (10 pm to 7 am), the maximum permissible limit for noise from industrial to residential areas is reduced to 50 dBA. The latter level applies to transmission lines that operate continuously. The WDOE accepts the 50 dBA level at the edge of the ROW for transmission lines, but has encouraged BPA to design lines with lower audible noise levels.

4.11.3.1 Construction Noise

Noise impacts would result from construction activities. However, this noise would be short term, occurring mostly during daylight hours. It would typically occur for a few days only at any one location, such as near a residence.

4.11.3.2 Transmission Line Noise

Corona-generated audible noise is of concern primarily for contemporary lines operating at voltages of 345-kV and higher,

Reminder

Corona *is a discharge at the surface of a conductor.*

Corona-generated noise can be characterized as a hissing, crackling sound. A technical definition is

during foul (wet) weather conditions. Based on meteorological records near the proposed transmission line routes, these conditions are expected to occur less than 7 percent of the time during the year. For a few months after line construction, residual grease or oil on the conductors can cause water to bead up on the surface. This results in more corona sources and slightly higher levels of audible noise and electromagnetic interference if the line is energized. However, the new conductors "age" in a few months, and the level of corona activity decreases to the predicted equilibrium value. The proposed line has been designed with three subconductors per phase, to yield acceptable corona levels.

During foul weather, there would be an increase in the perceived noise above ambient levels for all alternatives, at the edges of new ROW. The foul weather audible noise at the edge of the ROW for the new line alone would be 50 dBA. Along the sections of the Preferred Alternative (Segment D) where new ROW parallels the existing 230-kV ROW, the increase in line-noise levels during foul weather would be perceived as doubling the noise level at the edge of the ROW adjacent to the existing lines.

During fair weather conditions, which occur about 93 percent of the time in the study area, audible noise levels would be about 20 dBA lower than foul weather (if corona were present). These lower levels could be masked by ambient noise on and off the ROW and would probably not be detectable above ambient levels.

Off the ROW, the level of audible noise from the proposed line would be well below the 55-dBA levels that can produce interference with speech outdoors. It is also highly unlikely that indoor noise levels from the line would exceed the 35-dBA level, when sleep interference can occur. Since corona is a foul weather phenomenon, people tend to be inside with windows possibly closed, which decreases their perception of corona noise when it is present. In addition, ambient noise levels can be high during foul weather periods (due to rain hitting foliage or buildings) and can mask corona noise.

Audible noise from the new transmission line would be below EPA guideline levels, and would meet the BPA design criterion that complies with the Washington state noise regulations.

4.11.3.3 Substation Noise

Alternatives 1 or 1A, ending at the Hanford Substation, would pass through the existing Vantage Substation, but no expansions would be necessary within the substation grounds. The Preferred Alternative (Alternative 2) would bypass the existing Vantage and Midway

➡ Reminder

See Map 2, Alternatives, for location of routes and substations.

Substations. As a result, the area surrounding these two substations would not experience an increase in noise.

The proposed added equipment at Schultz Substation would not result in increased noise levels. The alternatives terminating at the Hanford Substation would not result in increased noise levels at the substation. The additional substation equipment required would be similar to the equipment already in use.

The Preferred Alternative would terminate at a new Wautoma Substation, which would be a new noise source in the area. As with all substations, noise levels from the new Wautoma Substation would depend on the equipment installed and the operating modes of that equipment. However, due to the rural location of the substation and the absence of any residences in the general area, noise impacts would be minimal.

Expansion of the Schultz and Hanford Substations and the creation of a new Wautoma Substation would be designed so that the maximum noise level at the property line would not exceed the 65-dBA level required by the Washington State standard for Class C property (industrial zones that includes range and agricultural lands).

4.11.3.4 Noise Impacts

Noise impacts are based on the level of the noise produced by the new line and the people present to hear the noise. If a nuisance level of noise is produced, but people sensitive to the noise are not present, then there is a low impact. This is the impact rating given for agricultural areas where the people present are primarily working. The noise impact levels shown in Table 4.11-2, *Noise Impact Level*, are for each alternative by segment.

Table 4.11-2
Noise Impact Level

	Seg A	Seg B	Seg C	Seg D	Seg E	Seg F	Overal l Impact
Preferred (2)	Low/Mod	Low		Low			Low
Alternative 1	Low/Mod	Low			Low		Low
Alternative 3	Low/Mod		Low				Low
Alternative 1A	Low/Mod	Low				Low	Low

4.11.3.5 Radio and TV Interference

Corona on transmission line conductors can also generate electromagnetic noise in the frequency bands used for radio and

television signals. This noise can cause radio and television interference (RI and TVI). Interference with electromagnetic signals by corona-generated noise is generally associated with lines operating at voltages of 345-kV or higher. This is especially true of interference with television signals. The three-conductor bundle design of the proposed 500-kV line is intended to mitigate corona generation and thus keep radio and television interference levels at acceptable levels.

Spark gaps on distribution lines and on low-voltage wood-pole transmission lines are a more common source of RI/TVI than corona from high-voltage electrical systems. This gap-type interference is primarily a fair weather phenomenon caused by loose hardware and wires. The new transmission line would be constructed with modern hardware, which would eliminate these problems and minimize gap noise. Consequently, this source of EMI is not anticipated for the proposed line.

Radio reception in the AM broadcast band (535 to 1,605 kilohertz (kHz)) is most often affected by corona-generated electromagnetic interference ***(EMI)***. FM radio reception is rarely affected. Generally, RI can affect only residences very near transmission lines. Predicted RI levels indicate that fair weather RI will be within the acceptable levels for all proposed route configurations, at distances greater than 100 feet from the outside conductor of the proposed line.

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Corona-caused TVI occurs during foul weather and is generally of concern for transmission lines with voltages of 345-kV or above, and only for conventional receivers within about 600 feet of a line. As is the case for RI, gap sources on distribution and low-voltage transmission lines are the principal observed sources of TVI. The use of modern hardware and construction practices for the new transmission line would minimize these sources. Predicted TVI levels at 100 feet from the outside conductor of the new transmission line, which would be operating at 500-kV, are comparable with TVI levels from other existing BPA 500-kV lines, and lower than that from the existing Sickler-Schultz 500-kV line.

There is a potential for interference with television signals at locations very near the new transmission lines in fringe reception areas. However, interference with television reception can be corrected by several approaches: improving the receiving antenna system; installing a remote antenna; installing an antenna for TV stations less vulnerable to interference; connecting to an existing cable system; or installing a translator. It is anticipated that all instances of TVI caused by the new transmission line could be effectively mitigated.

If interference should occur, there are various methods for correcting it, and BPA has an active program to identify, investigate, and mitigate legitimate RI and TVI complaints. Therefore, the anticipated impacts of corona-generated interference on radio, television, or other reception would be minimal.

4.11.4 Toxic and Hazardous Materials

Several common construction materials (e.g., concrete, paint, etc.) and petroleum products (e.g., fuels, lubricants, and hydraulic fluids) would be used during construction. BPA would follow strict procedures for disposal of these or any hazardous materials. No impacts would occur.

Some of the new substation equipment required at the Schultz Substation may contain oil. The new equipment at the Hanford Substation may contain oil, however, the Spill Prevention Control and Countermeasure Plan currently in place would be modified to include this expansion.

The Preferred Alternative would terminate at the new Wautoma Substation. The new line termination equipment required would contain limited amounts of oil. This equipment includes such things as: breakers, switches, capacitors, buswork, substation dead ends, and a control house. Since it is expected that there would be no transformers required at this new substation, a spill containment system is not likely to be installed.

Contaminated media (soil, surface water or groundwater) if unexpectedly encountered during construction of the project may present potential risk/liability to BPA. Potential risk and liability includes workers health and safety, management of contaminated materials and/or exacerbation of contaminated media (soil, surface water, or groundwater).

Should contaminated media be unexpectedly encountered during construction of the project, work will be stopped, and an environmental specialist will be called in to characterize the nature and extent of the contamination and to determine how the work may

safely be completed. Work will proceed only after measures approved by the WDOE are put in place to prevent the spread of contaminated materials and protect the health and safety of workers.

4.11.5 Fire

Construction of the new transmission line could take place at any time of the year. However, it can be expected that some construction activities will occur during summer when the weather is hot and dry. During the summer months, the potential for wildfires is high due to dry vegetation, such as sagebrush and grasses, along the new ROW. The fire risk increases even more with the increased use of vehicles and other motorized equipment used during construction. The addition of construction workers in the area also elevates the potential for fire. Vehicles would carry fire suppression equipment.

To prevent fires and other hazards, BPA maintains a safe clearance between the tops of trees and power lines. Because electricity can arc from a conductor to a treetop, trees are generally not allowed to grow over 20 feet high on the ROW. Trees that need to be cleared from the ROW, and any that could fall into the line (danger trees), are marked and removed.

4.12 Air Quality

4.12.1 Impact Levels

Impacts would be **moderate** if one or more of the following would occur

- An effect would be created that could only be partially mitigated.
- Air quality would be reduced locally.
- A possible (but unlikely) risk to human health or safety would occur due to air quality.

Impacts would be **low** if one or more of the following would occur:

- An effect would be created that could be largely mitigated.
- A reduction in air quality near the construction or clearing site would occur.
- The project would cause insignificant or very unlikely health and safety risks due to air quality.

For Your Information

***rona** is an electrical discharge at e surface of a conductor nsmission line. A technical finition is included in Chapter 9, ossary and Acronyms.*

hen corona is present, the air rrounding a conductor is ionized d many chemical reactions take ace that produce small amounts ozone and other oxidants. one comprises approximately 90 rcent of these oxidants, and the maining 10 percent is mainly mposed of nitrogen oxides. The tional primary ambient air ality standard for photochemical idants, of which ozone is the incipal component, is 235 crograms per cubic meter, or 0 parts per billion. The aximum incremental ozone levels ground level produced by rona activity on the proposed nsmission lines during foul eather would be much less than e part per billion. This level is ignificant when compared with tural levels and fluctuations in tural levels.

4.12.2 Impacts Common to Construction Alternatives

Construction vehicles and windblown dust from the construction sites and clearing activities would create short-term low impacts on air quality.

Construction vehicles and heavy equipment would emit pollutants such as carbon monoxide (CO), sulfur oxides, particulate matter, nitrogen oxides, volatile and semi-volatile organic compounds, and carbon dioxide (CO_2). Emissions would be short-term and would have low or no impact on air quality.

The only potential for long-term impacts to air quality would come from the new line itself, which cause limited air emissions. The high electric field strength of a 500-kV transmission line can cause a breakdown of air at the surface of the conductors, which is called ***corona***. The proposed 500-kV line is designed to have lower corona levels than is present on the older 500-kV lines in the area and would not result in impacts to air quality.

4.12.3 No Action Alternative

No impacts are expected from this alternative.

4.12.4 Recommended Mitigation

- In order to minimize windblown dust, water trucks would be used to spray roadways and construction sites when necessary.
- Lop and scatter would be used to recycle vegetation.
- To prevent erosion, disturbed areas would be reseeded with grass or an appropriate seed mixture.

4.12.5 Cumulative Impacts

Over the long term, the proposed project would cause no cumulative effects on local or global air quality.

4.13 Short-Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The alternatives under consideration do not pose impacts that would significantly alter the long-term productivity of the affected environment. A good example of this is the existing lines in the study area. They were built in the 1940's through the 1960's. The affected environment has recovered since then, and while there is never complete recovery the long-term productivity of the affected environment has not been significantly altered. Likewise, if the proposed project was built and then removed and the affected areas restored, little change in long-term environmental productivity would occur.

4.14 Irreversible and Irretrievable Commitment of Resources

The proposed project would include the use of aluminum, steel, wood, gravel, sand, and other non-renewable materials to construct steel structures, conductors, insulators, access roads, and other facilities. Materials may come either from on-site borrow pits or from outside sources. Petroleum-based fuels would be required for vehicles and equipment.

The proposed project would cause commitments that result in the loss of wildlife habitat for certain species and the loss of production or renewable resources, such as circle-irrigated cropland. The proposed project would irreversibly convert wildlife habitat and scrub-steppe habitat to utility and associated maintenance uses.

The proposed project would result in a loss of cropland and rangeland. These commitments are irretrievable rather than irreversible, because management direction could change and allow these uses in the future.

4.15 Adverse Effects that Cannot be Avoided

Implementation of the proposed project would result in some adverse impacts that cannot be fully avoided. These impacts and proposed mitigation are discussed under the specific resource section earlier in this chapter. Many adverse effects would be temporary, occurring during site-specific activities.

Some of the adverse effects that cannot be avoided in the proposed project include the following:

- The elimination small areas of vegetation, including wetlands and riparian vegetation, due to permanent physical developments such as transmission line structures and maintenance roads.
- Intermittent and localized decreases in air quality from dust caused by the construction, maintenance, and use of roads.
- Short-term soil compaction, erosion, vegetation degradation, and stream sedimentation from construction and maintenance.
- Short-term disturbance to wildlife during construction.
- Short-term disruption of agricultural activities during construction
- An increased level of habitat fragmentation and reduction in the amount of shrub-steppe vegetation available for wildlife habitat.